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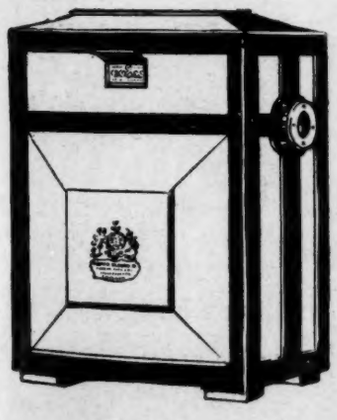

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EDITORIAL NOTES.

National Gas Council and the Society of British Gas Industries.

THE members of the Society of British Gas Industries expressed their views on the subject of their relations with the National Gas Council at their autumn meeting last Wednesday. But in the report presented by the Chairman (Mr. H. M. Thornton) on the work of last half year, and throughout the speeches of members, there was no display of any extreme irritation over the deliberate exclusion of the Society from representation on the Executive Committee of the National Council. But the feeling was there that the Society had been dealt with unfairly and harshly, and that an unjustifiable indignity had been put upon it. The members, too, were all loyal to their Chairman and Council, recognizing that they had done their best in the attempt to avert the break that has taken place in the symmetry and completeness of the most vital element in the organization of the National Gas Council, and showing a determination not to do anything to infringe the pledge given by their Chairman and the Council that, accepting the scheme as an emergency measure for the period of the war only, they would during that time stand by it, and work for its success. By the members, the matter is regarded as one for serious treatment, and not to be dealt with after the manner of a peevish child who, offended, says "I will not "play." They are going to—not "play," but continue to work as hitherto; and they are going to adhere to their position. They claim a right, from every point of view, to representation on what is the principal operative part of the national gas body; and their right is based upon position, qualification, past and present work, collaboration, and, in fact, upon everything that constitutes a good record for an established and useful organization. The Society, as previously stated, has become a force in the industry; and from this position there is good resolution on the part of the members that it shall not be dislodged.

Distinctions are frequently made that are weakly shams; and this is one of them. It would be possible to dilate on the distinction that has been set up as against the Society of British Gas Industries in a manner, from the point of view of trading, that would not be wholly to the advantage of many who are of the gas industry, but not of the Society of British Gas Industries. But we will not take such a line; for at the present time the deep feeling of grievance does not require to be stimulated. The question of distinction can be approached from other standpoints. It seems to be forgotten by some that the members of the Society are not insignificant retailers; they are something more than that. They are the principals, and not subordinates, in large enterprises all forming indispensable parts in the daily and permanent work of the gas industry. Comparisons are sometimes beneficial through the lessons they convey; and a few questions may be put which men of the gas-supply industry may, if they choose, consider in contrast with themselves. Are the qualifications of members of the Society at fault? Is their experience, technical and commercial—and of a kind not possessed by all gas-supply men—at fault? Are their financial interests in the industry at fault through insignificance? Is their reputation in initiative, organization, and management at fault? Are their qualities in these respects of less weight and value in and to the industry than those of the men of the gas-supply industry? These in effect are questions that were asked by Mr. Thomas Glover, of Edmonton, at last Wednesday's meeting of the Society. An answer may be challenged. If the answer to them is in the affirmative, then reasons must be given. If the answer to them is in the negative, the further inquiry may be put as to whether the qualities set forth would not be of value on the Executive Committee of the National Gas Council? If they would be of no service there, there is nothing more to be said. But there are some people who evidently do not for some inscrutable reason care to make the trial.

It cannot be advanced as a reason for exclusion from the Executive Committee that the members of the Society have shown any indifference to the work of the industry. The report of the Chairman on the activities of the past six months would alone be a denial of such a submission; and yet the subjects but briefly mentioned in the report do not indicate the time and serious discussion that have been spent over the various matters—time snatched from busy lives. The record of the Society, lined as it is with co-operation in the work making for the progress of the entire industry, supplies an answer to those who are not convinced that those who, through manufacturing and trading, participate in the fortunes of the industry are as concerned as they are themselves in every question of policy or government that affects prosperity, either by way of enhancement or otherwise. Still the members are debarred by the very men with whom they have collaborated from sharing in the inner work of the industry, for which work they have been building up qualification and justification for several years now. However, it is hoped by the Society that, before the end of the war, those who have been illogical enough to admit its representatives to the National Gas Council and to the General Consultative Committee, but refuse entrance to the most vital part of the whole structure (except when wanted for special purposes) will see things in a different and more rational light, and will amend what is now an infraction of the unity of interest, co-operation, co-partnership, and much else that the industry has adopted as principles, and have now cherished for some years.

The report by Mr. Thornton throws light on the attitude adopted by the representatives of the Society who took part in the discussions that have resulted in the formation of the National Gas Council. They made certain alternative proposals which were not unreasonable, and which would have saved them from exclusion from the active working body of the Council, and at the same time have brought into existence a separate Committee for dealing with the special affairs of gas supply, with which the Society do not desire to interfere in any way. Their proposal, briefly stated, was that the National Gas Council should be constituted as under the existing scheme, and that from the Council a Consultative Committee should be formed, with co-equal representation of the four organizations, to deal with matters of general interest and importance. This would have taken the place of the Executive Committee, though, for a Committee entrusted with dealing actively with work of importance, we do not like the term "Consultative," which is rather a misdescription. Then it was proposed that, in addition, a Committee should be formed from the National Council, consisting of twelve members, and all representatives of gas undertakings, to deal with affairs which are recognized to be connected solely with gas supply. It seems to us the machinery proposed by the Society is the preferable from the point of view of simplicity and fairness; and we cannot imagine what could have been the objection to it. Now that the terms of the alternative scheme are published, knowledge of them will not, in other parts of the industry, do anything to increase favour for the scheme adopted. The additional light shows how easily all grievance could have been avoided, and permanent foundations laid at once for a truly national gas institution. From what we learn, not only from the ranks of the Society but from the ranks of gas men in the provinces, the present settlement is only regarded as a temporary one.

Calorific Standard Applications—A Suggestion.

A LETTER in our "Correspondence" columns from Mr. John F. Simmance submits a suggestion which might be tentatively adopted by gas undertakings making application under the Gas (Standard of Calorific Power) Act, in order that, if they are successful in persuading the Board of Trade or the Local Government Board (as the case may be) as to its righteousness, there may be freedom, through agreement with the local authorities concerned, in the matter of the choice of apparatus to be used and the conditions of testing, so as to be in the position to adopt any improvements which give to the gas its full and legal due in the matter of "total "heat value." Whether the Departmental authorities will concur in this, or compel applicants to conform to the Model Clauses, cannot yet be said. But there are grounds for presuming that the latter course will be taken. As it is at the moment, the legislation already in existence affecting the calorific standard has not been regularized in a manner which gives confidence that what is the calorific power developed by a gas in one district is the calorific power that the same gas would be credited with in another area, owing to the use there of different apparatus and different conditions of testing. But Mr. Simmance's point is that a matter of greater fundamental importance than uniformity is that the gas supplied should not be denied, now or hereafter, the application of the apparatus and the conditions which will credit the gas with its total or maximum heat value. We agree with him. It is the principle that was adopted by Parliament, and defended by the gas industry, in connection with the illuminating power standard; and it is the principle that should govern the calorific value standard. The gas is entitled to its best value, and not a value reduced by a defect in apparatus or conditions.

Having put ourselves on the side of Mr. Simmance in regard to this matter, and supported his suggestion that applications under the new Act should be drafted so as to give the liberty he suggests in the matter of obtaining apparatus and conditions that will ensure the gas securing credit for its full heating value, instead of being bound fast to the apparatus and the prescriptions of the Metropolitan Gas Referees, the reasons may be stated for our fear that the Board of Trade and the Local Government Board may not be inclined to leave the question of apparatus and conditions an open matter as between gas suppliers and local authorities. There is evidence that on the part of the Private Bill Authorities, and especially in connection with gas supply, there is a disposition to standardization, which will not stop at the quality of the gas, without specifying, particularly or by reference, how the quality is to be ascertained. It is quite true that Mr. Simmance can point to variations in this regard in the enactments of Private Acts of Parliament. In some, it is provided that the apparatus is to be similar to that prescribed by the Metropolitan Gas Referees; in others, that both the apparatus and conditions of testing are to be similar; while under the terms of others (and this is what Mr. Simmance advises) the apparatus and testing conditions may be the subject of agreement between the gas suppliers and the local authorities. Though there are these variations, the Private Bill Authorities have made some attempt to bring about conformity through the terms of the Model Calorific Clauses; and, in various instances where there have been in the Bills as promoted departures from these clauses, there has been, before the Bills have advanced very far on their parliamentary journey, insistence on conformity with the Model Clauses. The case of the Dewsbury Corporation, in the session of 1915, may be instanced [see "JOURNAL" for March 23, 1915, p. 728]. The Corporation wanted the very liberty suggested by Mr. Simmance; the Local Legislation Committee preferred compliance with the Model Clauses.

There is, however, no safeguard in the Model Clauses of the principle that the apparatus and the conditions of testing shall be the most suitable for ascertaining the maximum or total heat value of the gas; and this is a weakness of the Model Clauses. All they do is to specify the use of the apparatus and conditions as prescribed by the Metropolitan Gas Referees; and the Referees in the matter of prescription receive their authority under, and are bound by, the Gas Light Company's Act of 1914. This Act provides that the apparatus and conditions of testing are to be the most suitable for ascertaining the total heat value of the gas. But it is only the Gas Light Company who can raise the question as to whether the apparatus and conditions as prescribed by the Gas Referees are the "most suitable;" and if the Company does not see fit to appeal, if other apparatus or conditions are forthcoming (there may be private reasons for it not wishing to do so), against the prescribed apparatus and conditions, all gas undertakings coming under the Model Clauses will in consequence be prejudiced. The position is an anomalous one; and more especially as it cannot be said that there is universal satisfaction with the prescribed apparatus, and particularly with the conditions of testing.

We have referred to this matter on previous occasions—for example, in the paragraph already mentioned in the "JOURNAL" for March 23, 1915, as well as a fortnight earlier, on p. 572. Evidently the views which were then in circulation have been confirmed and received extension; for Mr. Simmance now puts the matter as strongly as to describe as "notorious" that the method of testing prescribed by the Referees is unsuitable to a small provincial company or a local authority employing a gas examiner to make occasional tests. It may be objected that Mr. Simmance's suggestion as to choice of apparatus and conditions being left to agreement between the parties would give too much latitude to the whims and fancies of some gas chemists and testers, and that for the sake of peace gas suppliers would often (as now in connection with pipe-laying powers) give way to the advisers of the local authorities rather than insist on their own views, with the likelihood of incurring the opposition and displeasure of those authorities. At the same time, if the full liberty proposed by our correspondent is not granted, the Model Clauses should, in justice, include the right of appeal, so as to ensure the securing of the "most suitable" apparatus and conditions for ascertaining the maximum heat value of the gas. The right of appeal would probably not lie dormant very long.

Dilution of Labour in Gas-Works.

THE pamphlet that was noticed in the "JOURNAL" last week regarding the employment of women in gas-works constituted an appeal to those gas managements who are not doing all they might do in this matter to reconsider their position, in order that a still greater number of men may be released for active service at the front. There are some gas-works that are already "on their uppers" in respect of skilled labour; there are others in regard to which the suspicion exists at the War Office that more men than are really necessary, if full resort be had to women labour, are being sheltered by the badges of the Ministry of Munitions. There are signs that a closer eye is being kept by the local tribunals on these works; and that there will now be some considerable difficulty in further retaining certain of these men, in view of the accrued experience with female labour on other works. Beyond this is the fact that more men are required in order to maintain the British military machine at its maximum fighting power. This fact is a stubborn thing. The lines at the front have to be recruited from somewhere; and the Man Power Distribution Board have made it clear that in the Government Departments, in the industries generally, including badged industries—in fact, in every quarter—there will have to be closer scrutiny of men, and that more eligibles for the fighting line will have to be taken. The eligibles are the medically fit men; and the medically fit men in gas-works are generally the most skilled, while the medically unfit are the less skilled, and two or three of the latter are often required to make up for one skilled man. But this fact cannot always be advanced as a defence to retention on the ground of indispensability. Nor can the further fact that it is reckoned that for most gas-works operations in which women can be employed women power is equal to about two-thirds that of man power, be regarded as a defence to the retention of men whose work can be done, though perhaps not equally as well in every respect, by women.

But whatever is done in the matter, the differences of the present position of gas-works in the matter of the release of men and the employment of women must, in the combing-out process, be taken into account, and so too must the relation of man power to benzol and toluol recovery be also brought into the calculation. It is further recognized by the authorities that, owing to the complicated character of the machinery and the heavy weights that have to be shifted in gas works, women cannot possibly take the place of many of the men; and the authorities, too, who are pressing this matter must remember there are differences in the classes

of women available in different quarters of the country. Many of the women in the northern industrial parts of the country can easily tackle work that it would be utterly impossible for southern women of different physique to perform; so that experiences on gas-works in one part of the country cannot be taken to be wholly capable of application to all parts. This point affects the variety of occupation mentioned in the list included in the pamphlet referred to last week. But in connection with the operations of gas-works anywhere, there is much more work that can be done by women; and those managers who have not already availed themselves of women labour to the fullest possible extent, having regard to the age and medical fitness of the men employed, should at once set to work to prepare themselves for eventualities by doing so. Better get women well in training for the work now than suddenly be faced with a compulsory further shortening of man power and the introduction of raw women power. There need be no fear in regard to the employment of women, as to the application of the Factory Acts. It is promised that these will be duly relaxed in cases where the service requires it owing to the taking of men for military purposes. Even Acts of Parliament have to bend to the exigencies of the times; and so must gas-works. But before gas-works are further touched, the authorities ought to ensure that there are less important services that have not yielded their maximum of men to the country's forces. The gas industry has a right to this consideration, in view of what collectively it has done, is doing, and hopes still to do, and without which work disaster to this country and its Allies would have been inevitable.

Low-Temperature Carbonization.

There are in the world a good many intelligent people who do not think a great deal of the prospects of low-temperature carbonization; and there are, of course, some—such as professors, company promoters, electrical engineers, and a small sprinkling of men technically versed in carbonization—who are of the contrary opinion. Mr. Wallace Thorneycroft, the new President of the Institution of Mining Engineers, is not enamoured of the process. This is clear from the address that he delivered at the recent meeting. There is only one real difficulty of which he is cognizant respecting the system of low-temperature carbonization, and that is the difficulty of making it pay. Much, of course, depends upon the saleable value of the raw coal used. The bye-products have considerable value; but the resultant char is the chief product. It is practically of the same bulk as the original coal; and it is (say) 60 per cent. of its weight. It is soft and easily crushed, it contains all the original ash, and it will very readily absorb water. For these reasons, Mr. Thorneycroft finds that this low-temperature coke is difficult to sell at an adequate price. Like several others, too, he is of opinion that developments in this direction will rather take the lines of pre-carbonization at temperatures which will yield the maximum of valuable oils, and then destructive distillation, so that all the realizable calorific value is available as gas. This would be done in gas-producers, accompanied by ammonia recovery. It should not be overlooked that the prior treatment for the recovery of the oils will reduce the total amount of ammonia obtainable from the gas-producer plant; and it has yet to be demonstrated that the value of the oils is greater than that of the loss of ammonia, and the expense of working.

De-Badging the Absentees.

How to most effectually deal with absenteeism at the coal mines is one of the problems of the moment; for its reduction means much to output. It will be remembered that the Departmental Coal Organization Committee stated, in the report they recently issued [*ante*. p. 12], that the steps taken to reduce absenteeism had had some good effect, but more drastic methods would have to be applied if peaceful persuasion had not greater result. Peaceful persuasion has not so far succeeded; and therefore some other course should now be tried. The various means proposed are: The de-badging of absentees, the suspension of the Coal Mines (Eight Hours) Act, the increased employment of women and boys on the surface, and increased economy in consumption. We know how the miners and owners all look with fear to the consequences of any interference with the Coal Mines (Eight Hours) Act; the employment of additional women and boys about the pits is regarded with great disfavour; and how the country is to be induced, through the myriads of consumers of coal in large and small quantity, to practice coal economy is a matter that has not yet been satisfactorily explained. It is very difficult to bring home to the ordinary householder the fact that every little bit of economy helps in these war times. But there is the de-badging proposal, and compelling the man who will not do his full part in the mines to go to the front, and relieve a miner who is married, and who will return home and put in full time at coal getting. This seems to be a sensible suggestion; and putting it into operation would be bound to have some effect. The "Iron and Coal Trades Review" approves of it, and believes that it would be the means of materially increasing production.

Experiences in the Industrial Use of Gas.

A useful contribution to the subject of the industrial applications of gas was made by Mr. A. B. Roxburgh, Chief of the Sales Department of the Newcastle and Gateshead Gas Company, at the recent meeting of the North of England Gas Managers' Association. If the author had deliberately set himself the task of proving to those responsible for the conduct of gas undertakings that, if they desire to make a real success of the industrial branch, they must have a specialist in charge, he could not have presented a better case; for the variety of special purposes for which gas heating is required in the area within which Mr. Roxburgh operates, and the many distinct types of appliances which have in consequence been found necessary there, and which are not included in the stock patterns of the makers, have meant the choice between the alternatives of the presence of a man who could design what was wanted, or the loss of valuable gas business. In one respect, Mr. Roxburgh's experiences appear to be directly opposed to a policy of which he seems to be in favour—that is, the putting of the makers of these industrial appliances in direct communication with the consumers, and letting them carry out the orders of the latter. His view is that the gas authority can safely leave to the makers the matter of meeting the consumers' wants. We take it that he means in respect of ordinary appliances, seeing that he has not been able to leave to them the special installations he mentions, and which supply the staple subject-matter of the paper. Even in regard to ordinary appliances, the matter is one of policy. And we would rather favour the policy that keeps the gas suppliers in touch with those appliances from their installation onwards, seeing that the makers cannot possibly maintain any oversight of them after their introduction. Experience generates principles; and here and there in the paper are found examples. In connection with one job, for instance, Mr. Roxburgh says that two essentials were disclosed that should be applied to all gas-heated apparatus, if economy is to be realized. The first is to strictly limit the space for the products of combustion; the second is that no air should be drawn over the heating spaces other than that necessary to support combustion. What is meant by "strictly limiting" the space for the products of combustion would have been better understood by further explanation or illustration. The need of cleanliness to the maintenance of efficiency is another point upon which insistence is made.

Fixed Gas and Air Adjustment.

Incidentally, towards the end of the paper, Mr. Roxburgh raises a question which is of a controversial character. It is that of fixed gas and air regulation as contrasted with regulation at every gas-burning point. He is very much in favour of fixed adjustment, and finds that, where it is the practice, maintenance is fractional compared with any other burner of which he has had experience. And he suggests that now is an opportune time for the gas supplier and the gas apparatus manufacturer to work in conjunction—the former by providing information as to the specific gravity and thermal value of his gas, and the latter by abolishing adjustments, and providing a range of suitable nipples. We are, from actual experience, in agreement with all this, providing that there are standard pressures (or a governor on each service-pipe), and standard composition of gas, density, and calorific power, which standards are approximately complied with. In the area of the South Metropolitan Company (straight coal gas only is supplied), the "Metro" burner, with its fixed regulation, has become very popular. But transfer that burner to another district not far distant; and it would not, under present or ordinary winter circumstances, gain the same popularity for well-

known reasons. Fixed regulation—however proper it may be—puts limits on gas manufacture, where both coal and carburetted water gas are made. Mr. Roxburgh states that the range of variation in gas conditions over which a nipple will work with perfect satisfaction is a considerable one. This depends upon whether the range of variation affects more than one factor in the conditions necessary to the use of the fixed regulation. However, the satisfaction that is expressed with the fixed regulation speaks well for the consistent character of the gas supplied in Newcastle.

A Plea for a Definite Policy.

That those having charge of municipal trading undertakings should be guided by consistent and intelligible principles, and that the adoption of a definite and coherent policy is just as much needed by the legislative and sanctioning authorities as by the local bodies entrusted with carrying out schemes which have obtained parliamentary sanction, was the argument advanced by Councillor James Johnston, J.P., of Belfast, in a paper presented by him at a recent conference of the Association of Municipal Authorities of Ireland. This is, of course, a view that is widely held; the point on which a difference of opinion generally arises being as to just what the "consistent principles" and the "coherent policy" really should be. Take, for instance, the subject of profits and the rates. The author himself, while maintaining that there should be no difference of opinion as to the desirability of placing all local authorities in the same position, recognizes that it is hopeless to expect general agreement as to the best methods of dealing with surplus profits. No doubt, he is right; for after years of discussion, ideas with regard to the precise relationship which should be held to subsist between a profitable municipal trading concern and the burdens of the general body of ratepayers are still divergent. By this time, readers are well aware of the "JOURNAL" views as to what should be the nature of the settled policy which it is "eminently desirable that Parliament should decide upon" for application in these cases, so that "local authorities should obtain from Parliamentary Committees uniform treatment." Councillor Johnston has a suggestion of his own in the matter. On the assumption that undertakings of local authorities can obtain the necessary capital at an average rate of at least 2 per cent. less than ordinary trading companies, he submits that municipal undertakings should contribute annually at least 2 per cent. on their total capital outlay to the relief of the local rates, and that their charges should be adjusted to secure adequate profits for this purpose. Another reason he gives for this allocation of profits is that these undertakings receive very substantial benefits from their association with municipal administration; but he does not seem to have placed a definite percentage value on this.

Destruction of Household Refuse.

The use of small size garbage destructors as an appendage to the domestic gas-range appears to be making way in the United States, under the title of "Gas Incinerators." They can be had in combination with gas-cookers of the cabinet type, so arranged as not to occupy additional floor space. A special instance is the City of Indianapolis, where a very serious epidemic of typhoid supplied the *motif* for a successful incinerator sales campaign, conducted by the local gas company. The Editor of "Gas Industry," in referring to this matter, mentions that from personal experience he knows the gas incinerator to be both efficient and economical. and has found that the best way to use it is to start with a thin layer of crumpled paper, as a base for the first batch of refuse, another layer of paper can follow, then a second lot, and so on until the furnace is full. If of sufficient capacity to contain three or four days' waste, the lower layers are dried to a considerable extent by the continuous draught of air through the furnace and out at the chimney, which so far facilitates ignition of the contents that frequently the supply of gas is only required for 10 to 15 minutes, to start combustion, when the garbage will continue to burn until completely consumed. A gas company should have no difficulty in securing the interest of the medical profession, or of the local Board of Health, in this proposition, as a means of preventing epidemics, or of checking them when they are actually in progress.

The Manchester Municipal School of Technology have invited Professor A. G. Green, F.R.S., late of the University of Leeds, to take charge of a new department in the school for advanced study and research in the subject of coal-tar chemistry. The new department will be open only to post-graduate students, or to those of equivalent attainments, whether trained in Manchester or in other chemical schools of the country. The realization of this scheme has been greatly assisted by the support that has been rendered by the Privy Council Committee for Industrial Research.

THE NATIONAL GAS COUNCIL.

Constitution of the General Consultative Committee.

THE adoption of the scheme of a National Gas Council, composed of the Councils and Committees (as the case may be) of the Institution of Gas Engineers, the Society of British Gas Industries, the British Commercial Gas Association, and the Gas Companies' Protection Association, has quickly been followed by the election from these bodies (nine members from each) of the General Consultative Committee. From the Consultative Committee, an Executive Committee of twelve members is to be appointed; but, in this instance, the constitution is to be only of municipal and company gas undertaking representatives. Through inquiry of Mr. Walter T. Dunn (Institution of Gas Engineers), Mr. W. M. Mason (British Commercial Gas Association), and Mr. F. E. Cooper (Gas Companies' Protection Association), we are able to give at once the composition of the General Consultative Committee. The representatives of the Society of British Gas Industries were elected at the meeting last Wednesday.

INSTITUTION OF GAS ENGINEERS.

Mr. A. E. Broadberry (*President*)	Tottenham
Mr. Thomas Berridge	Leamington
Mr. John Bond	Southport
Mr. W. Doig Gibb	London
Mr. Samuel Glover	St. Helens
Mr. Harry Kendrick	Stretford
Mr. W. E. Price	Hampton Wick
Mr. Robert G. Shadbolt	Grantham
Mr. John Young	Hull

SOCIETY OF BRITISH GAS INDUSTRIES.

Mr. H. M. Thornton (*Chairman of Council*)	London
Mr. T. A. Braddock (*Hon. Treasurer*)	Oldham
Mr. J. W. Broadhead	Elland
Mr. Charles Clare (*Hon. Secretary*)	London
Mr. Samuel Cutler, jun.	London
Mr. W. D. Helps	Leeds
Mr. Percy F. Holmes (*Vice-Chairman*)	Huddersfield
Mr. Fred. J. West	Manchester
Mr. H. James Yates	Birmingham

BRITISH COMMERCIAL GAS ASSOCIATION.

[*Subject to Alteration.*]

Mr. George Clarry	Cardiff
Bailie J. C. Drummond, J.P.	Glasgow
Mr. F. W. Goodenough	London
Alderman Kay, J.P.	Manchester
Alderman Phillips, J.P.	Salford
Sir Hallewell Rogers, J.P.	Birmingham
Mr. W. J. Sandeman	Croydon
Mr. T. Waddom	Newcastle-on-Tyne
Mr. D. Milne Watson	London

GAS COMPANIES' PROTECTION ASSOCIATION.

Mr. H. E. Jones (*Chairman*)	London
Mr. R. Bruce Anderson.	London
Mr. Charles Carpenter, D.Sc.	London
Mr. R. W. Edwards	Aldershot
Mr. T. H. Hazell	Newport (Mon.)
Mr. Douglas H. Helps	Reading
Mr. A. A. Johnston	Brentford
Mr. S. Y. Shoubridge	Lower Sydenham

[In the original nominations, Mr. Thomas Waddom was included in this list; but as he is one of the nine representatives of the British Commercial Association, another member will have to be proposed in his stead for the Gas Companies' Protection Association.]

The General Consultative Committee have not delayed in beginning the work entrusted to them of formulating a scheme of working. They met yesterday afternoon; but a responsible task of this kind will probably take some little time. It is, however, to be hoped that as much information as can with propriety be divulged will be sent out from time to time for publication, in order to keep interest in the new Council fully alive.

Exit the Gasholder.—An account of the installation of a gas supply at Waycross, Georgia, U.S.A., is published in "Gas Record." The population of the town and district is 20,000, and 17 miles run of mains has been laid, with provision for about 400 services. A complete coal-gas plant has been provided, and space left for a carburetted water-gas plant. The apparatus already put down comprises two beds of six retorts each, air and water cooled condensers, exhauster, washer, scrubber, and 12-feet purifier boxes. Gas is to be turned into the mains this month; and a number of ranges and water-heaters have already been sold. But the especially interesting feature is the storage plant, which does not follow the orthodox lines, but consists of six high-pressure storage tanks, of a capacity of 10,000 cubic feet each, and an Ingersoll-Rand compressor. In view of the high prices of material and labour, which are not likely to be substantially reduced for many years to come, the fact that compression is less prejudicial to the calorific than to the photometric value of a gas, and the continually increasing demand for high-pressure supplies, it is possible that the storage plant in this progressive American town may be regarded as a "shadow beforehand" of a new chapter in gas-works storage and distribution.

OBITUARY.

The death is announced of Mr. S. K. Watson, a well-known resident of Tunstall, who was connected with the British Gas Light Company until about three years ago, when he retired on a pension. He was in his 74th year, and had passed more than half his life in the Tunstall district.

The announcement that Captain Alexander R. Gibb, of the Royal Field Artillery, has been killed at the front, will evoke much sympathy with the family throughout the gas profession. Captain Gibb was the fifth son of the late Mr. John S. Gibb (formerly Treasurer of the Edinburgh and Leith Corporations Gas Commissioners) and brother of Mr. W. Doig Gibb. A Solicitor by profession, and a first-rate athlete, he had been a keen Territorial for a long time, and had attained Captain's rank before war broke out. He had been fighting over a year-and-a-half, and received his first wound (which, however, was not a severe one) just about a month ago.

The Monmouth Gas and Water Company lost by death last week, with tragic suddenness, both the Chairman and the Secretary and Manager. While Mr. T. Brace, J.P., who occupied the latter dual position, when walking in the street on the Sunday, fell to the ground in a dying condition, and expired shortly after being conveyed home. Death was due to apoplexy. Mr. Brace, who was 68 years of age, had been connected with the Company for half-a-century. He was one of the best-known inhabitants of Monmouth, and widely respected, as was evidenced by the large gathering at the funeral service in the Monmouth Baptist Church on Wednesday afternoon, prior to the remains being taken to the Baptist Churchyard at Whitebrook for burial. The coffin was carried by employees of the Monmouth Gas and Water Company; and there were many wreaths from public bodies, the local magistrates, &c. Mr. E. Maffia, the Chairman of the Company, was discovered dead in bed, the previous Sunday night. A few hours before deceased retired to rest, it was stated at the inquest on Wednesday, he heard of the sudden death of Mr. Brace, and was much affected by the news. The Jury returned a verdict of "Death from syncope," accelerated by the news of the sudden death of his friend and colleague.

PERSONAL.

At the official meeting of the Kilrush Urban District Council Gas Committee, seven applications were received for the vacant Gas Managership, and that of Mr. Henry M'Elwee, of Athy, was favorably entertained, pending some inquiries.

The Military Cross has been awarded to Lieutenant L. R. Moir, Duke of Cornwall's (Pioneer) Light Infantry, for conspicuous bravery in the field. Lieutenant Moir, who received his commission this year, enlisted two years ago in the R.A.M.C., prior to which time he was engaged as a civil engineer on the Leeds Water-Works.

Mr. Charles R. Ingham, who at the outbreak of war was serving his articles at the Ossett Gas-Works, joined the Public Schools Brigade in May, 1915, and was sent to the front in November. After serving six months in France, he was recommended for a commission, and returned to a Cadet Battalion stationed at Oxford. He has now been gazetted to the 3rd West Yorkshire Regiment.

Alderman William Henry Jessop, J.P., who is Chairman of the Huddersfield Corporation Health Committee, and was for twelve years Chairman of the Gas Committee [1901 to 1913], has been asked to accept the Mayoralty. Alderman Jessop, who is the "Father" of the Council, was Mayor of the County Borough of Huddersfield in 1897-8 and 1898-9. He is well known throughout the municipal world.

Sir Robert K. Inches, the Lord Provost of Edinburgh, who is a Vice-President of the British Commercial Gas Association, has declined the suggestion made to him by a number of friends to continue in office for another year. Addressing the members of the Water Trust, he said that he felt on this occasion it was in the interests of peace and goodwill, and therefore, perhaps, in the interest of the city, that he should not give his sanction to his name being used as a candidate for the Lord Provostship.

It was stated in last week's "Journal" that Mr. J. H. Troughton, of Huddersfield, had been appointed Gas Manager to the Haverhill Urban District Council, whereas it is Mr. F. C. Troughton who is taking up this position. Mr. Troughton, who is a son of Mr. J. H. Troughton, of Newmarket, received his training as a gas engineer at the Cambridge Gas-Works, under Mr. J. W. Auchterlonie, afterwards holding the position of Assistant Manager to the Felixstowe Gas Company. For the last eight months he has been employed by Messrs. Heap and Digby, of London, Consulting Engineers, as Resident Engineer at the works of British Dyes Limited, at Huddersfield, superintending the erection of plant.

Mr. Eric W. Morrison, who is at present engaged as Engineer's Assistant to Mr. J. W. Morrison, the Chief Engineer of the Sheffield United Gas Light Company, has, we understand, been appointed Superintendent at the Eastcroft works of the Nottingham Corporation Gas Department. He was educated at Wesley College, Sheffield, and at Denstone College, Staffordshire; was articled to his father, Mr. J. W. Morrison, at Sheffield; and on completing his indenture in 1911, was appointed Clerk of Works over the very extensive alterations which have, during the last few years, been carried out at the Neepsend and Grimesthorpe works. Mr. Morrison holds First Class Honours in "Gas Engineering" at Sheffield University and the City and Guilds of London Institute.

Mr. J. P. M'Crae, who has been successful in obtaining the position of Assistant Engineer to the Derby Gas Company, is a son of the late Mr. John M'Crae, who was Gas Engineer to the Dundee Corporation. Mr. M'Crae, who is 34 years of age, was trained in the Dundee Gas-Works, which were re-constructed during his pupilage. He was engaged for three years as Assistant Engineer at the Hexham Gas-Works, and was then for ten years Manager (under the Chief Locomotive Engineer) of the Great Northern Railway Gas-Works—costs being reduced and results improved very considerably. For the past fifteen months he has occupied the position of Assistant Engineer to Mr. Robert Watson at the Doncaster Corporation Gas-Works. Mr. M'Crae holds a number of certificates, including First-Class Honours in "Gas Manufacture."

APPLICATIONS UNDER THE STANDARD OF CALORIFIC POWER ACT.

It is well known, and it has been frequently admitted in high places, that the Gas (Standard of Calorific Power) Act, although a measure of the kind might have seen the light of day at some later date, would not have been introduced just now had it not been for the benzol and toluol requirements of the nation, and therefore the necessity for the oil-washing of gas. In connection with the framing of the Act, Mr. F. L. Halford, of the Explosives Supplies Department of the Ministry of Munitions, and his technical adviser, Mr. W. Doig Gibb, were frequently consulted. Since the passing of the Act, the Board of Trade have also called Mr. Gibb into consultation; and at the first inquiry—the application of the Cheltenham Gas Company for the standard—Mr. Garnham Roper, who represented the Board, invited Mr. Gibb to assist him as technical adviser, and that assistance is going to be continued. In the circumstances of his connection with the Explosives Department and of the fact that he is being consulted by the Board of Trade in the matter of the technical aspects of applications and oppositions, Mr. Gibb has had to decline invitations from various gas undertakings to represent them before the Board of Trade in this one particular. But, of course, this will not affect other professional work. However, the gas industry generally will be pleased to know that a qualified gas engineer is rendering technical assistance to the Board in determining questions arising out of these applications for the calorific standard.

CALORIFIC STANDARD ACT APPLICATIONS.

Sixth Official List.

Applications have been made to the Board of Trade by the following Gas Companies for Orders under the Gas (Standard of Calorific Power) Act, 1916; the standard proposed being 500 B.Tb.U.:

Brighton and Hove General Gas Company.
Swindon United Gas Company.

On the invitation of the Urban District Council, the Manchester District Institution of Gas Engineers will hold their meeting at Wombwell, on the 28th inst. The making of the necessary arrangements has been left in the hands of the Chairman of the Gas and Water Committee (Mr. Joseph Mitchell) and the Gas Manager (Mr. P. D. Walmsley, B.Sc.). After light refreshments at the Town Hall, the gas-works will be inspected. The members will then be the guests at luncheon of the Mitchell Main Colliery Company, whose bye-product coking plant will subsequently be visited. In the afternoon there will be a business meeting in the Carnegie Library Lecture Hall, at which a paper will be read by Mr. Walmsley and Mr. H. A. Morley, entitled "Some Notes on Benzol Recovery and Rectification."

A patent has recently been taken out by Mr. H. K. Tompkins, of Champion Hill, S.E., for a new petrol substitute, the constituents of which are cheap and entirely obtainable in this country. The fuel consists essentially of a solution of ethane and its higher gaseous homologues or isologues in paraffin oil or other liquid hydrocarbon under pressure. Coal gas produced by the low-temperature distillation of coal is washed with paraffin oil or other liquid hydrocarbon under pressure and at a low temperature; and the solution of hydrocarbon gases so obtained is delivered under pressure into drums. For use, the solution of gases is drawn off from the bottom of the drum, and is delivered into the carburettor through a small orifice, without wire-drawing, so as to obtain the full atomizing effect of the dissolved gases. The paraffin oil is partly or entirely volatilized in the carburettor, according to the proportion of dissolved gases.

ELECTRICITY SUPPLY MEMORANDA.

THE question of reform in the electricity supply industry has been debated up and down with vigour during the past few months; and it has been approached by many avenues, direct and indirect.

Electrical Reform.

The views that have been expressed are so variegated that it is obvious there is no common agreement as to the courses that should be taken to arrive at the goal. Co-operation, co-ordination, centralization, and other notions are afloat as presenting the effective means to the desired end; and that end is the cheapening of supply with the view to increasing its availability and application throughout the land. The object is a very laudable one; inasmuch as every industry owes it to its day and reputation to do its utmost to promote the economies and conveniences of the people. Some few months ago, Mr. Ernest T. Williams read a paper which set the ball rolling afresh on the subject of electrical reform, in regard to the desirability of which there is, practically speaking, unanimity. But the discussion since has been discursive; and those who have taken part in it have strayed from the main point of Mr. Williams's idea as to the means by which reform can be achieved. He apparently does not believe in miracles being possible in regard to such a mundane thing as electricity supply, the present position of which has taken many years and much capital to create. Quick conversions do not appeal as satisfactory to his practical mind; and in aspiring to co-ordination of the electrical systems of the country on the most economic basis, he looks to a new form of control. From this point, the controversy has wandered. Mr. Williams writes to set the matter right, and to try to keep the electrical flock on the road along which it should go. There is already, of course, Government control of electricity supply in a not very satisfactory form. There is that of the Home Office, the Local Government Board, the Board of Trade, and Parliament itself. There is no co-ordination of control, no live connection between the supplying undertakers and the Government, and no scientific plan for the electricity supply of the country as a whole. This indicates general chaos, which is not a good condition for maximum efficiency.

The Board and Development.

It may be remembered that the chief proposal in Mr. Williams's paper was that the regulation of the industry should be vested in a professional Public Board, which should watch over the industry as a whole, having regard to the interests of the public and the legitimate interests of the supply undertakings. The Board, being brought into existence by Act of Parliament, would be really a *quasi*-Government Board, which is not the same thing as a Government Department. The Port of London Authority is taken as an illustration of a somewhat similar organization; and the "remarkable success" of its administration is said to be the justification for such bodies. Under a Board, electrical enterprise, it is thought, would be much extended; and private enterprise would be encouraged to the maximum extent. The Board would operate in conjunction with existing undertakers when this was to the interests of all, and aim at developing supply in such districts as were unprovided for. The shareholders of companies should realize, says Mr. Williams, that if reform can be effected in which their interests are protected, and in which their further enterprise is encouraged, then they have everything to gain by it. Another point in the paper was that drastic alterations and the immediate sweeping away of existing generating stations were not contemplated. The proposed Board would lay out plans for the supply of the country to meet its requirements (say) fifteen years hence, and then see that all new plant, new stations, new interconnecting mains, &c., were devised to form part of the final scheme. The necessity for, and value of, a transition period was insisted on both for economic and administrative reasons. The establishment of the Public Electricity Board would inspire confidence, and justify the broader view being accepted by individual undertakings. There is no reason to fear that, because powers are vested in a Public Board sympathetic to electricity supply, personal interests would suffer. These are among the views of Mr. Williams, who concludes the letter by which he essays to cause consideration to revert to his main proposal by expressing the hope that the time may not be far distant when the Council of the Institution of Electrical Engineers with the support of the whole industry and shareholders, may be able boldly to approach the Government, and ask for parliamentary authorization of a complete scheme of reform by which development would be fostered.

A Predicted Sensational Slump.

When the "All Highest" or the High Military Command has an unpalatable piece of news to communicate to the German people, he or they adopt the gradation process of breaking it to them, instead of letting it fall among them like a high explosive bomb from a *Z*eppelin, intent on the murder of civilians, including (to attest German gallantry and bravery) women and children. "Meteor" of the "Electrical Times" has begun to practise the German procedure in respect of letting bad news fall gently. His opening note in the issue for Oct. 5, only comprised half-a-dozen lines. It stated: "Several of the London station engineers are speaking rather pessimistically of the working results that will be disclosed in their forthcoming reports. In some instances, the slump in profits is likely to be sensational. There will be a few cases—though there are one or two lucky ones—where progress has been made." "Pessimistically" and "sensational" suggest that due foresight has not been exercised upon a sufficiently liberal scale. The words betoken heavier expenses, insufficient increase of prices, and a greater drop in consumption than were calculated. The falling-off in the demand for high-priced lighting units in districts where there is no scope for compensation in a substantial power demand for munition purposes, has done its work, through the influence of the Summer Time Act, and the war-lighting restrictions and economies. In reference to daylight saving, "Meteor" has come to the profound conclusion at which we had already arrived, that the institution will become a hardy annual, and that no one with artificial light agents for sale must expect to receive any sympathy. However, in some areas of supply, the electrical engineers, as the result of daylight saving, report a substantial diminution in the demand for lighting units. Percentages amounting to 10, 11, and 15 have a weighty appearance; and they will make a deep impression on one side of the revenue accounts, while the costs of coal, oil, and labour, will be prominent on the other side.

Electric-Cookers for "Humble Circumstances."

The cost of installation of electricity consuming appliances is one of the drawbacks with which the electrician has always to contend. He finds it somewhat monotonous to be faced with this everlasting difference in cost, to his disadvantage and to the advantage of his competitor. He knows, too, that all that is done to lower the initial cost of the appliances is an attack on efficiency, durability, and safety; and any decline in all or any one of these respects is a perpetual disturber of his peace of mind. But he has to bear this in the cause of increased, if frequently dissatisfied, custom. If the cheap goods had the same equality in service as the more expensive ones, there would be little reason for making the latter. Electric-cookers have been the subject time and again of attempts to get out something cheaper. We hear of many of these things; but they do not appear to have lasting favour or fame, except in the latter regard for some defect. However, the Carron Company have good reputation; and they have been trying to relieve the electrician from the disability of being able to offer a substantial cooker at a reasonable rent. The "Electrical Times," in noticing the Carron endeavour, admits that the need for a cooker of the kind is keenly felt; but it does not say that the Carron Company have succeeded in meeting the requirements. It only goes so far as to remark that the Company "claim" to have done so. However, from the description, it is seen that the cooker is suitable for tenements or flats, and is said to be capable of carrying out a number of operations at small cost. Experience has taught electrical engineers that there are a number of details about a cooker that are necessary to efficiency, economy, and safety. In this case, however, we read that the cooker, "being a self-contained unit, needs only to be connected up to the supply cables, although the makers recommend that a fused main switch, with pilot lamp or other form of indicator be provided, so as to cut the cooker completely out of circuit when it is not required." But "in order to reduce the cost of the apparatus, these refinements have been omitted." Thus a "recommendation" of the makers is characterized as a "refinement," and sacrificed in order to help to contribute to cheapness.

Structural Details.

A few details as to the construction of the cooker may be given from our contemporary. But it should first be stated that, while the description does not mention the price, it is asserted that it is listed at a figure which "should bring it within the reach of many consumers in humble circumstances." The cooker (which is to be a sort of hall-mark of "humble circumstances") is constructed with cast-iron front and back, with sheet-steel inner and outer casings, the space between which is heavily packed with non-conducting material. Electrically generated heat must necessarily be strongly safeguarded. The lagged oven door is hinged at the bottom, so as to form a shelf when open. The dimensions of the cooking space is 12 in. by 12 in. by 12 in., with heating elements top and bottom, wired for three-heat control. The lower element is of the enclosed pattern, loaded to 1200 watts; protection being given from accidental contact as well as from the effects of liquids, greasy and otherwise. The upper element is of the open-coil variety, similarly loaded and wired for control. There is no separate grill; but the top heater serves the useful function, used at full heat. A hot closet with drop door is provided above the oven and beneath the solid hot-plate. The plate is built up with enclosed elements loaded to 1200 watts, and arranged for three-heat control. The working area is ground to a plane surface, and is said to be large enough to accommodate "two or three" flat-bottomed pans of "moderate" size. The connected load is 3·6 KW., which the author of the description states "should permit of its use with any existing lighting service." "Should" suggests caution, for which there is plenty of scope in introducing cooking and heating appliances to many existing lighting services situated amid "humble circumstances." We know some of those electric lighting services; and a few minutes may be profitably

spent in meditating over certain of the wiring rules of the Institution of Electrical Engineers.

Development of Electric Cooking Business.

The "Electrical Review" has been reading a report by the Electric Range Committee presented at the Chicago Convention of the National Electric Light Association; and, having done so, it is so impressed that it takes the opportunity of urging those interested in promoting electric cooking in this country to abandon the haphazard system of the past not only in regard to the design, but the manufacture and marketing of the electric-stove. "The placing of electric-cookers," a gas salesman remarked the other day, "requires the highest possible intelligence; the displacing of the electric-cooker is a much easier task, because the cooker itself paves the way, and every electric-cooker displaced adds to the difficulties of the local electrical man." But the "Electrical Review" article and the report of the Electric Range Committee deal rather with the matter prior to the lodgment of the cookers with the users. Our contemporary thinks electric cooking has good prospect of becoming an immense business, and that it is useless to attempt to grapple with it on any but commercially organized lines, the logical essentials of which are quantity, production, standardization, interchangeability of parts, and mutual guarantees as between manufacturers and supply authorities as regards price and disposal of parts. "Only in some such way as this—with present electric heating methods—can we hope to place electric cooking on a really competitive basis, and to achieve real success with it." This is an electrical acknowledgment of facts pretty well known to certain people who do not happen to be electricians. However, to the report of the Electric Range Committee. They state that the type of electric range most of all desired seems to follow the lines of the "popular" gas-range. Four three-heating elements on top are advocated—one 1500-watt, two 1000-watt, and one 750-watt. The ovens should be at least 12 in. by 15 in. by 18 in., and should contain a broiling element and a baking element. A warming oven above the ordinary oven is a desirable adjunct; and the doors should open downwards. It is considered that an oven with hot-plate should be obtained at $30 to $35; but some responsible heads of supply undertakings rather fear that low price may mean sacrifice of quality, and the creation of harm to electric cooking. The price named is not the experience for a well-made electric-cooker in this country; and it does not appear to be anywhere within reach here. It is stated that the costs for installation vary (the range is a considerable one) from $4 to $30, and average $12½. For the reduction of expenses, standardization is recommended; the development of hot-water attachments and durable elements is urged as essential; and the combination of undertakings to secure good terms in quantity purchasing is a piece of strategy that the manufacturers of gas appliances would not relish in this country. However, these are indications, among several other less important ones, as to the methods which are being followed in developing the electric cooking business in America.

TECHNICAL JOURNALISTS AT LEEDS AND SHEFFIELD.

Visits to the Universities.

With the object of seeing for themselves what is being done there in the direction of the application of science to industry, a tour was, on the invitation of the Universities of Leeds and Sheffield, undertaken last week by the Technical Circle of the Institute of Journalists; some twenty members—with the Chairman, Mr. Leon Gaster, at their head—joining in the visit. The party included Mr. P. N. Hasluck (the Secretary of the Circle) and Mr. S. Walton, of the Ministry of Munitions. Some months ago, with the same object in view, a visit was paid to the Imperial College of Science in London.

The first inspection was of Leeds University, where, assembling in the great Hall, the visitors were received by the Vice-Chancellor (Dr. M. E. Sadler), after which everything was seen, under the guidance of the professors. The first department visited was that of organic chemistry, which as a subject of teaching and research has always occupied a high place in the work of the University. The department deals mainly with those branches of science which underlie many of the most important technical processes, and provides a training, not only for students who are to become teachers of chemistry, but for a larger number who desire preparation for the great variety of industrial processes dependent on chemistry—such as the manufacture of dyes, explosives, and drugs, and the leather, dyeing, coal-tar, and fuel industries. Professor H. R. Proctor was the guide in the Department of Leather Industries; while Professor A. F. Barker conducted the party through the Department of Textile Industries, which, it is said, shares with the Department of Colour Chemistry the distinction of being the best-equipped in Western Europe. The research staff includes Mr. W. Harrison, M.Sc., Lecturer in Textile Chemistry, who is also well known to "Journal" readers in connection with ventilation research work for the Institution of Gas Engineers. The Department of Colour Chemistry and Dyeing is under the direction of Professor A. G. Perkin, who recently succeeded Professor A. G. Green. The department is particularly well equipped for research work relating to dyestuffs. There is a special laboratory for explosive work, in which improvements have been effected in the manufacture of both T.N.T. and picric acid. Allied forms of war work were also seen in the Department of Coal Gas and Fuel Industries, where, under the direction of Professor J. W. Cobb, great efforts are being made to increase the supply of toluene and benzene by extraction from coal gas.

On the following day, the members were taken over the Sheffield University by the Vice-Chancellor (Mr. H. A. L. Fisher) and a number of professors. This University is the first technical institution in the country to take up the scientific teaching of glass technology. A site has been purchased on which buildings are in course of erection; and it is hoped that before Christmas the new Glass Institute will be erected and will be undertaking important optical problems for the Ministry of Munitions. In the medical work done at the University great interest was evinced; and, in another direction, the visitors were informed of the recent foundation of a scholarship in Russian. Another departure which was mentioned was the forthcoming establishment of a course in inorganic chemistry for women. This is to be started at the request of one of the great steel firms, and its object is to supply women, almost immediately, sufficiently trained to take up work in the chemical laboratories of the steel industry. The great development of the applied science department of the University from the early days of thirty years ago was explained by Professor Ripper, who described the metallurgical department. He said that from the very first it was established upon practical lines. Sheffield had specialized on metallurgy; and in this respect its University was distinguished from every other University in the world. It had been thought in many institutions that a pure science training alone was sufficient, and that the student would get his practical training in the works. The Sheffield plan, however, had been based upon the belief that it was important to provide practical training from the start. There had been more researches of value and importance to the metallurgical industry conducted from the Sheffield Institution than from any other—probably from a good many of the others combined. In connection with the mechanical engineering department, there is an arrangement by which the students spend the winter six months at the University, and the summer six months in the works.

Representative manufacturing works in both cities were also visited.

Journal of the Manchester School of Technology.

An idea of the scope and quality of the work carried out in the Manchester Municipal School of Technology will be gathered from the record of the investigations by some members of the school during the year 1914, which comprises Vol. VIII. of the school's "Journal." And the manner in which this record is presented affords still further evidence in the same direction, inasmuch as in the general get-up the book is a production with which the Department of Printing and Photographic Technology of the school may well feel satisfied. In a prefatory note, the Principal (Mr. J. C. Maxwell Garnett) points out that one of the functions of the school is to provide the university training which is now coming to be regarded as almost essential to all members of the higher staffs of important industrial concerns; while the conduct of industrial research, for the most part in co-operation with firms engaged in the industries of South-East Lancashire, forms another very important branch of the work. One of the objects dealt with is the "Dilution Limits of Inflammability of Gaseous Mixtures," by Dr. H. F. Coward and Mr. F. Brinsley. This portion of the volume has been reprinted from the "Transactions of the Chemical Society;" and the same remark applies to a paper on the "Ignition of Some Gaseous Mixtures by the Electric Discharge," by Dr. H. F. Coward, Mr. C. Cooper, and Mr. J. Jacobs. Then Mr. F. S. Sinnatt has a contribution on the subject of "Industrial Gas Burning," and another (reprinted from the "Journal of the Society of Dyers and Colourists") on the "Action of Sulphuretted Hydrogen upon Sodium Hydrosulphite;" while he and Mr. B. J. Cramer describe a method devised by them for the determination of carbon monoxide in air—this article being reprinted from the "Analyst."

The autumn general meeting of the Midland Association of Gas Engineers and Managers will take place in Birmingham on Thursday, the 26th inst.

The annual general meeting of the Southern District Association of Gas Engineers and Managers will be held at the Hotel Cecil on Thursday, the 16th prox., at 2.30. It has been decided to have a general discussion, to be opened by the President (Mr. W. Doig Gibb), on the question of oil-washing and matters arising therefrom. Afternoon tea will be served at 4.30.

The opening meeting for the present session of the Scottish Junior Gas Association (Eastern District) is fixed for Saturday afternoon of this week, at the Heriot Watt College, Edinburgh. The Council have arranged to inaugurate an annual lecture to be delivered at the opening meeting; and the lecturer on this occasion will be Mr. Harold Hartley, M.Sc., Head of the Research Department and Chief Chemist to the Richmond Gas-Stove Company, who will deal with the "Construction of the Gas-Fire."

A LARGE DOMESTIC HOT-WATER SUPPLY INSTALLATION.

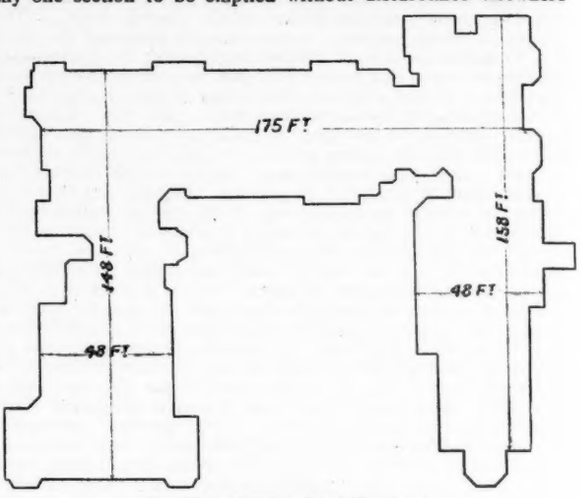
Coke-Heated Boilers and the Potterton Pocket System.

THERE are hot-water systems and hot-water systems. Their design and installation are, of course, controlled by the work that is required of them in the provision, circulation, and delivery of hot water. Some installations are comparatively easy to make; others are more difficult; some—through the variety of needs, the number of points of delivery, and the differences in levels, in a large establishment—appear to be complicated to an extraordinary degree. With pipes and connections, &c., delineated on paper, some of the more complicated systems look much like "maze" puzzles in which the patient elucidator is called upon to find his way in to the centre and then out again. A drawing of the kind is seen at the foot of the page; and it gives graphic indication of the big problems the present-day hot-water engineer has to encounter. For such work, a real hot-water expert, with a large range of experience, is necessary; it is no use putting on to such a job a person with merely rudimentary knowledge, for that might be a very expensive experiment.

This specimen of large hot-water work, in which coke-boilers are employed, has been carried out by Mr. Thomas Potterton, of the Cavendish Works, Balham. The establishment is a recently erected block of flats, known as the Lady Workers' Homes; and they are situated in Abbey Road, St. John's Wood. The construction of the flats was carried out by the Central London Building Company, of 116, Judd Street, W.C., who are associated with the London Housing Society, Limited, to whose courtesy we are indebted for permission (given through Mr. Potterton) to publish these particulars and drawings. The complex character of the arrangements for the hot-water supply is shown by the drawings. It will be seen that in plan the building is L shaped; being about 300 feet long, and covering an area of upwards of 15,000 square feet. There are six floors over the rear portion of the site, with a seventh storey on the Abbey Road front. The building provides flats, having five or six rooms, to accommodate families, besides smaller apartments for single tenants. There are in all 121 tenements, each of which is fitted with a bath and sink, and, in the case of the larger flats, a lavatory basin in addition. Central heating was not decided on till the building was in full carcase and partly finished; and, in the absence of a sunk heating chamber, a position on the ground floor (as nearly central as possible) was selected, where the necessary flue-shafts were available.

In order to meet the large distribution of the taps and the heavy demand for hot water in the early morning, a total reserve of 2000 gallons is provided, with the storage divided into eight sections, each acting as an auxiliary to the primary storage in the heating chamber. Twin wrought-iron coke-heated vertical boilers, with internal cross-tubes, are employed, with a capacity of 630,000 B.Th.U. per hour, each connected separately into the primary cylinder, with 3-inch full-way gate-valves, emptying pipes, and other equipment, so that either can be emptied down for repairs or cleaning without entirely cutting-off the supply.

The primary storage cylinder has a capacity of 400 gallons, and stands vertically (7 feet high) beside the boilers in the heating chamber. The eight auxiliary hot-water cylinders are situated in cupboards on the first floor; being only about 3 feet above the dome of the primary cylinder. Intermediate circulation of 2½-inch main with 1½ inch and 1¼ inch branches connect these to the primary cylinder; the circulation being carried on the overhead system in relation to the storages on account of the friction resulting with the extensive run to be covered. Stop valves are provided in each case, with an emptying pipe and valve to enable any one section to be emptied without disturbance elsewhere



Site Plan of Abbey Road Mansions.

From the top of each auxiliary cylinder, secondary circulations are carried to reach as nearly as possible the respective points, which in all amount to 113 baths, 113 sinks, and 40 lavatory basins—totalling no less than 266 points. Balancing-tanks of 40 gallons are provided in the case of two circulations serving the front block where the seventh storey exists, and therefore would suffer in delivery when a number of taps are open, due to its close proximity to the level of the cold-watern cisterns, which are situated on the flat roof of the front block. Open expansion-pipes are carried from the highest point of each section; the whole passing along the top floor, and collected in the lift shaft, from which point delivery above water-line is available.

The run of piping (the whole of which is galvanized) is as follows:

	Size. Inches.	Run. Feet.
Cold feed	3	170
Primary circulation	3	40
Intermediate	2½ and 2	500
Secondary circuit	1½, 1¼, and 1	1400
Draw-offs and expansions	1¼, 1, ¾, and ½	3550
Total		5660

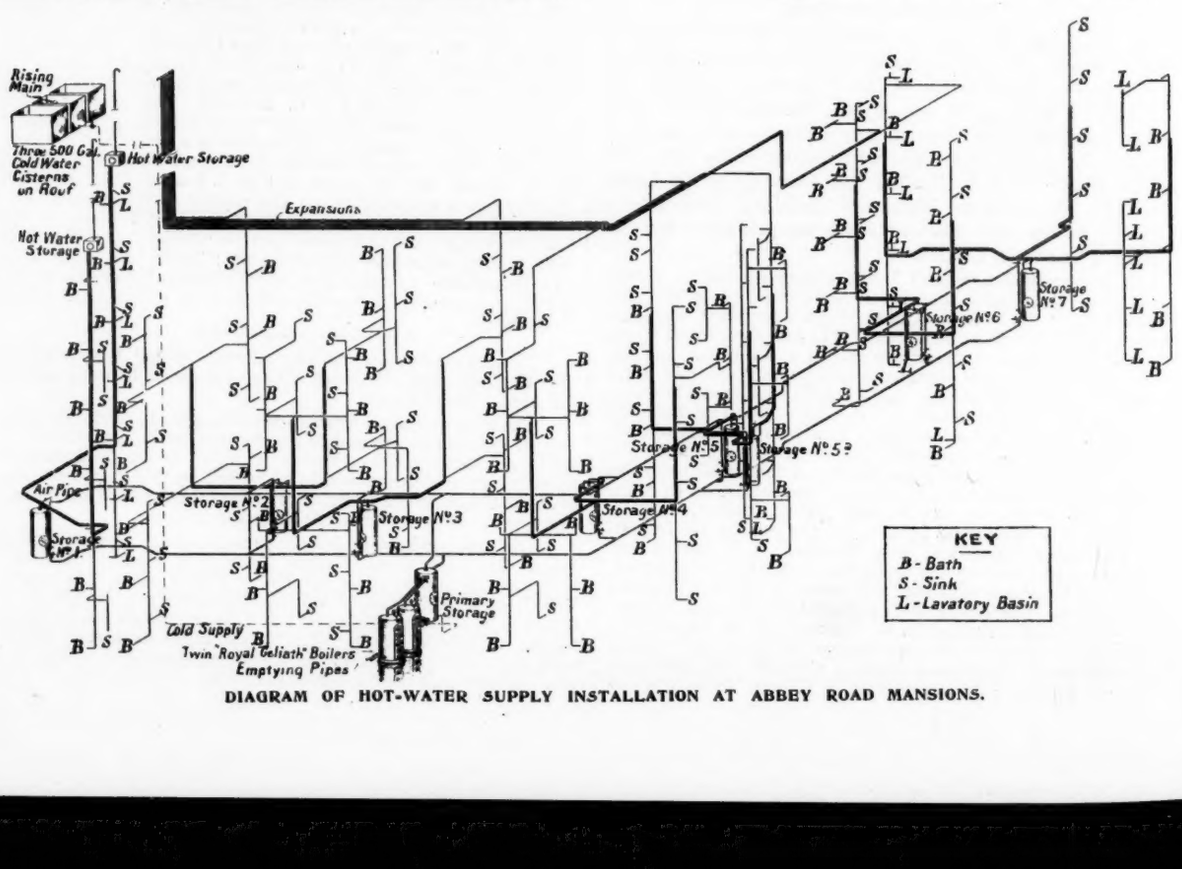


DIAGRAM OF HOT-WATER SUPPLY INSTALLATION AT ABBEY ROAD MANSIONS.

The boilers, cylinders, and all piping where circulation occurs are covered with asbestos composition, to prevent loss of heat from radiation.

One of the special and (we may say) valuable features of the installation lies in the design of the circulation and storages. The arrangement of the intermediate circulation and cylinders provides that the excess of hot water used on any one of the eight sections does not affect or diminish the reserve of the others, except as far as the contents are concerned of the primary cylinder, which is common to all the taps. It was principally with this view that the division of the apparatus into sections was adopted.

It is a remarkably fine hot-water installation, and its size and the requirements particularly favour the use of coke as fuel. Four chaldrons of coke per week are consumed, with two-thirds of the building occupied. When it is fully occupied, it is estimated that 6 chaldrons will suffice for all the requirements. There is every satisfaction on the score of economy—more particularly having in view the considerable amount and erratic character of the work the system has to meet—by the requirements of the occupants of 121 tenements.

A REINFORCED CONCRETE TAR-TANK AT ALDERSHOT.

By R. W. Edwards, of Aldershot.

In common with other gas undertakings, it has been found advisable in recent years at Aldershot to consider the best practical means for the additional storage of liquid products—the principal reasons for this being to ensure better facilities for the handling and disposal of the tar, and so cope with the heavier demands for its commercial and general uses, and to meet the growing production of this bye-product in excess of the present underground storage capacity. This state of affairs is on account of the increased output of gas for the needs all-round in the Company's extensive area of supply; and, moreover (which is of especial importance), there has arisen everywhere the necessity for a continual supply of tar for the manufacture of high explosives. The question of cost for this additional storage, under prevailing conditions at Aldershot, was also of some importance, and entailed close attention, as the considerable rise in steel and iron prices has brought storage tanks so constructed to a very high capital outlay.

After careful consideration, I therefore confined my attention to the construction of a storage tank in reinforced concrete, which resulted in this means being adopted as the most suitable and economical practice, after taking into due account all the circumstances.

The illustration and particulars, which I hope may prove of some interest, as reproduced, are of an elevated tar-storage tank designed to contain 100,000 gallons, and recently constructed on the "Coignet system" of reinforced concrete at the Company's North Works, Ash Road—all the plans for the work being prepared by Messrs. Edmund Coignet, Limited, in accordance with my directions.

As shown in the photograph, the tank is circular in shape and elevated on twelve reinforced concrete pillars, so as to bring the underside of the tank to a height of 4 feet from the ground level, in order to facilitate the filling and handling of barrels, &c. The general dimensions of the tank itself are 31 ft. 4 in. internal diameter, and a height of 21 ft. 3 in. measured from the floor level inside to the springing of the domed roof, which has a rise of 3 feet at the centre.

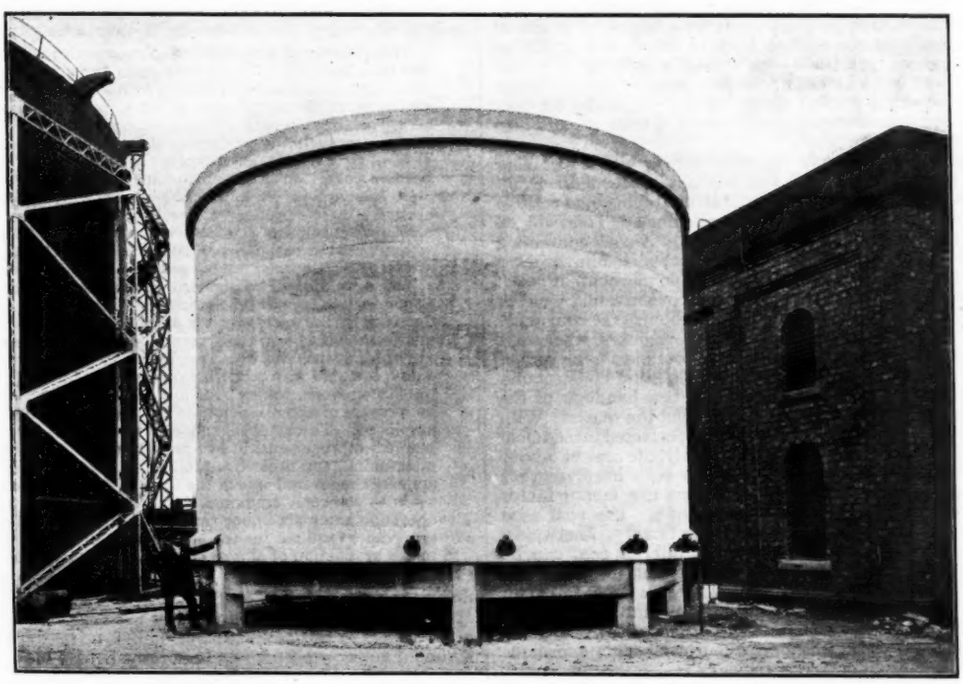
The tank has been provided with four valves, which are fitted so as to be readily accessible for the purpose previously mentioned—of filling the barrels, principally for local demands. These can be brought in front of the valves on trolleys. A reinforced concrete manhole is provided in the dome of the roof, for the purpose of inspection; and the necessary inlet and outlet pipes, as also the number of vents deemed to be required, have been properly fitted.

A circular gutter is formed around the dome, in reinforced concrete, to collect the rain-water; and a suitable outlet has been provided in this gutter, by which means the water is taken away through a cast-iron downpipe complete with head and shoe.

The reinforced concrete work was executed by means of round bars of mild steel, and the twelve supporting pillars are made to form 14-inch by 14-inch scantlings, and contain four longitudinal bars of small diameter, bound together by a spiral wire tie.

On account of the nature of the ground, it was determined to excavate to a depth of 8 feet, in order to reach a solid stratum of gravel, upon which was first laid a suitable thickness of ordinary concrete for supporting the reinforced concrete footings and pillars. The beams supporting the floor-slab are also composed of straight bars arranged in tension and in compression—these being bound together by means of wire stirrups at suitable intervals. The scantlings of the beams are 10-inch by 20-inch, measured from the underside of the floor; while the outer beams, which form an octagon, are of scantlings 10-inch by 22-inch.

The floor or bottom of the tank is composed of a meshwork of small bars. The thickness of this floor is $7\frac{1}{2}$ inches; and a circular bottom beam surrounds the tank in order to absorb the lateral pressure at the joint between the walls and the floor. The walls have been made of a uniform thickness of 6 inches from top to bottom, in order to facilitate the placing of the concrete and to simplify the construction of the timber moulds.



The reinforcement of the walls consists of a certain number of vertical rods, to which are tied (by means of annealed wire) the horizontal bars that are bent in accordance with the periphery of the tank. The diameters of these bars vary between $\frac{11}{16}$ inch and $\frac{3}{8}$ inch; and they are spaced gradually further apart in an upward direction, and in accordance with the pressure exerted on various parts of the wall. The ends of these bars are simply overlapped sufficiently to prevent them from slipping through the concrete. The dome of the roof is also composed of a meshwork of $\frac{1}{4}$-inch bars, and is only 4 inches thick.

Inside the tank, and arranged in a coil, a steam-pipe has been provided, in order to heat the mass of tar as may be required. A final application of "Ironite" was given inside the tank.

The Junior Institution of Engineers on Saturday afternoon paid a visit to the Wood Green electricity generating station of the Tottenham District Light, Heat, and Power Company.

RISE AND DEVELOPMENT OF BYE-PRODUCT COKING.

[COMMUNICATED.]

THE manufacture of coke has been carried on on a large scale since the beginning of the seventeenth century. It was not, however, until about 1880 that the method of manufacture came to be regarded in any way as a scientific process, as it was only at that time that attention was strongly directed towards the recovery of the bye-products formed during the distillation of coal. Prior to that, it had been found that the rectangular type of oven, heated externally by a portion of the gas evolved from the coal, was a very satisfactory type. This was the form of oven introduced by Coppée in 1861; and on the lines of this oven practically all systems of modern bye-product ovens have been developed.

The beehive oven has, however, by no means been displaced. It is estimated that at the present time [1916] about 20 per cent. of the coke manufactured in Great Britain is made in ovens of this type; while in the United States of America 60 to 70 per cent. of the coke is so made. When bye-product coking was first introduced, it met with strong opposition on the part of ironmasters, on the ground that the dirty-looking "cinders" made in the newer apparatus were not as good as the coke they were accustomed to use. It was, of course, only to be expected that such a violent change should meet with some opposition. Moreover, the whole system was more or less in the experimental stage, and good results could not, therefore, reasonably be expected. The coke produced had not a very prepossessing appearance when compared with beehive coke, largely owing to the fact—now well understood—that the coke was quenched in the open-air, which in itself tends to give it a dark appearance.

Numerous objections were also put forward against the use of bye-product coke in furnace and foundry work; the principal ones being, apart from the appearance, that the beehive coke was harder, larger, and more dense than bye-product coke, and that the pores of the beehive coke were larger. These factors were said to operate very considerably in the successful working of the blast-furnaces; and it was several years before the prejudice, which soon became deep-rooted, could be eradicated. The only way to remove such prejudice was by a series of practical trials of bye-product coke against beehive coke; and in almost every instance where such trials were made, it was found that bye-product coke was quite as satisfactory as beehive coke. There is, however, even at the present time a distinct preference for beehive coke for use in connection with foundry operations, and also for the making of crucible steel.

The writer has made many inquiries with a view to solving the mystery of this preference, but has not succeeded. From an economical point of view, the manufacture of beehive coke is one of the most waseful processes in existence. This will be readily seen from the following comparison. A coal containing (say) 30 per cent. of volatile matter when carbonized in beehive ovens would not yield more than from 55 to 60 per cent. of coke; whereas the same coal treated in bye-product ovens would yield 65 to 70 per cent. of coke The time taken to carbonize the coal in the beehive oven would be anything from 48 to 72 hours, whereas it would take probably not more than 24 to 36 hours in a bye-product oven. With the beehive oven the nature of the construction prohibits the use of mechanical plant for the handling of the coal and coke, or for charging and discharging the ovens. With bye-product ovens, on the other hand, highly perfected mechanical arrangements are in operation. Consequently, the cost of labour per ton of coke made is considerably higher with beehive ovens than with bye-product ovens, and, nowadays, the labour factor has indeed become a very difficult proposition. The coal used in beehive ovens must be of a very particular quality, otherwise a suitable coke will not be produced. Much inferior coal can be successfully carbonized in bye-product ovens; and owing to the introduction of compressing machinery, a suitable dense coke can be produced. In addition, there is to be taken into account the fact of the recovery of the valuable bye-products. This in itself forms a considerable item, and one which represents enormous revenue to the bye-product coking industry.

It is important to note that in Germany beehive coke-ovens have been entirely eliminated. On account of this great loss of bye-products, some writers have gone so far as to suggest legislative prohibition of beehive coking. It should not be forgotten that there are cases where circumstances are such that the operation of beehive ovens is largely justified. A bye-product coke-oven plant is expensive; and many points have to be considered before erecting such a plant. Roughly speaking, it costs rather more than £1000 per oven to provide a complete installation—that is, ovens, machinery, and bye-product plant, but excluding benzol-recovery plant. The smallest installation usually erected is not less than twenty to twenty-five ovens; and with such a plant it is an open question whether it is desirable to recover benzol. Allowing a carbonizing capacity of 6 tons of coal per oven per day, a continuous supply of 150 tons per day is necessary, Sundays included. Now there are numerous small collieries at which excellent coking coal is raised—coal particularly free from sulphur and phosphorus—and at which the daily production is about this amount. As the coal is so good for coking purposes, it undoubtedly pays the colliery companies far better to manufacture coke than to sell coal. Are they to erect a bye-product coke-oven plant? In most cases, certainly not.

In the first place, there should always be a fair margin of tonnage between production at the colliery and consumption for coking purposes; so that some provision can be made against accidental stoppage of the colliery, strikes, &c. Again, it is probable that, with such a small output, the coal area possessed is small, or the seams of coal being worked are nearing exhaustion. If the colliery has only a comparatively short life, it will not pay to erect a bye-product coking plant and have to scrap it in a few years. The owner of such a colliery, therefore, has, in his own interests, really no option. He can get a good price for beehive coke, and therefore he makes it. To beehive coke produced in such circumstances—and there are many such cases throughout the country—no objection can really be taken; but in the case of the great installations of beehive ovens at collieries with a large supply of coal assured for many years to come, the objections put forward always apply. It has also been suggested that a co-operative scheme of coking would overcome the difficulties in the case of a number of small plants in the same locality. The coal from several sources could be sent to a central bye-product coking plant run on co-operative lines.

The possibilities of expansion into other and allied branches of chemical industry in connection with bye-product coking are very great; and as a financial proposition, bye-product coking is certainly one of the most attractive investments, both from the point of view of security and of dividends, that has been available for several years past. As has already been pointed out, a good deal of capital is necessary for the erection of a complete bye-product coking installation; but this should not prove an obstacle to any colliery company not having the necessary capital at their disposal. Practically, all the leading firms of coke-oven builders are themselves prepared to go into partnership with colliery companies for the erection of bye-product coke-ovens on a mutual basis—the builders providing the whole or a part of the capital required, and the colliery company undertaking to supply the coal. On this basis, it is not difficult to conceive a satisfactory agreement, to the eventual benefit of both parties concerned.

It is of great interest to quote two paragraphs which appeared in a recent official report of the United States Geological Survey dealing with coke production in the United States in 1912, remembering that more beehive coke is made in the United States than in the rest of the coke-producing countries put together.

> The quantity of coal required to produce a ton of coke is much less than formerly. The average gain in 1912 compared with ten years ago is probably at least 160 lbs. It is doubtful if in the earlier years the actual yield of coke from coal exceeded 60 per cent.; whereas in 1912 it was 67 per cent. This gain is largely due to the increase in the production of bye-product coke, in which the yield of coke from a ton of coal is very much higher than in making beehive coke. In Illinois, Indiana, Massachusetts, Michigan, New Jersey, New York, and Wisconsin, where coke is made exclusively in bye-product plants, the yield varies from 69·6 per cent. (Wisconsin) to 81·8 per cent. (Indiana); whereas in States where beehive practice prevails, the yield in 1912 varied from 50 per cent. (Georgia) to 66·5 per cent. (Pennsylvania).
>
> The development of modern mechanical appliances has also done much to forward the efficiency of the retort-oven, and to reduce the labour necessary per unit of output. The same crew of men who twenty years ago were required to handle twenty-five of the small ovens, and who were carbonizing (say) 110 tons of coal a day, are able with modern equipment to handle fifty or more of the larger ovens, coking 1000 tons of coal a day. This represents an increase of about ninefold in the tonnage carbonized per man employed. These developments have been accompanied by marked improvements in bye-product recovery in the manufacture of ammonia and other bye-products. Twenty years ago the only ammonia recovered was in the form of crude liquor running from 12 to 15 per cent. ammonia. Now coking plants produce at one operation ammonia liquor ranging from crude, through the different grades required for the manufacture of flameless powder, &c., to the production of almost chemically pure aqua ammonia.

Bye-product coking now ranks as one of the most important industries in the country; and the possibilities of its development are almost unlimited. In the past it has been largely in the hands of foreigners in this country; but there is no reason whatever why it should not now become an important British industry.

(To be continued.)

Manchester Chemical Club.

A promising session lies before the Manchester Chemical Club, of which Mr. Thomas G. Marsh has been appointed President. In happier days, monthly lectures by capable exponents of various subjects interesting to the members constituted one of the principal features of the Club; but the war has to a large extent interrupted them. Now, under Mr. Marsh's presidency, these lectures are to be revived as far as possible; and there can be little doubt as to the wisdom of taking this step, at a time so very opportune for the discussion of such subjects as fuel saving, the utilization of bye-products from coal, both in gas-works and coke-oven practice, and other matters with which chemists and chemical engineers are concerned. Members of the Club are, it may be remarked, mainly chemists; but there are some chemical engineers among them. In fact, the Club does not attempt to bind itself to chemistry alone, but includes members from the gas and other allied industries. The meetings take place in the Victoria Hotel.

SOCIETY OF BRITISH GAS INDUSTRIES.

THE Autumn General Meeting of the Society was held last Wednesday, at the Holborn Restaurant. The attendance was a considerable one, notwithstanding the present pressing claims on the members at their works. Mr. H. M. THORNTON, J.P., the Chairman of the Council, presided.

REGRETS.

The SECRETARY (Mr. Arthur L. Griffith) referred to the letters received regretting inability to be at the meeting. The first was from the President (the Right Hon. H. E. Duke, K.C., M.P., Chief Secretary for Ireland). Among the letters from members was one from Mr. Fred J. West, who is going to the United States; and Mr. Griffith said he was sure he was expressing the general feeling when he said he hoped that Mr. West would have a safe journey out and home again. Mr. H. James Yates was away from home; and Mr. Pearson-Perry found at the last moment that he could not be in London. But he commended to the consideration of the members the question of the protection of British trade, and the making of every effort to secure the appointment of a Minister of Commerce.

The CHAIRMAN then read the following

REPORT ON THE HALF YEAR'S OPERATIONS.

The months that have passed since our spring meeting have been eventful ones. History is in the making; the fate of Empires is being decided; the mould for the lives of many generations is being cast. The year 1916 will be recorded as the one in which it became apparent that the pendulum had definitely swung in the Allies' favour; that swing which received its first momentum—probably imperceptible, but nevertheless decisive—at the Battle of the Marne in the autumn of 1914. "The Germans are defeated," Venizelos is reported to have said at that time; "but it will take them two years to find it out." Meeting to-day, with our hearts full of the promise of victory, and elated at the triumphs of our brave soldiers and sailors, we believe that Venizelos prophesied truly. The enemy is defeated; and he knows it! The end, though hardly yet in sight, is certain. In these eventful happenings, the members of our Society, individually and collectively, have had a part to play; and, in the report I present this afternoon, it will be found that matters concerning the war figure prominently.

PERSONAL MATTERS.

I must, however, first make reference to the loss which we, in common with the whole gas industry, have suffered by the death of our ex-President, Sir Corbet Woodall, whose unique place in the profession will not easily be filled in this generation. It was with a sense of personal loss that, representing the Society, the Secretary and myself attended the funeral service.

This afternoon we regret the absence of our President, the Rt. Hon. H. E. Duke, K.C., whose duties as Chief Secretary for Ireland make it impossible for him to be with us. It will, however, always be a deep source of satisfaction to us to remember that it was during his presidency of our Society that he was called by the King to undertake his present high office. On behalf of the Society, I offered him congratulations on his appointment. Our loss, however, has been the nation's gain; and we are well content. The President still shows his interest in our work. He has been good enough to grant me several interviews, and to correspond on matters relating to the Society's work; and his guidance has been of the greatest value.

HONOURS AND HONOURABLE NATIONAL SERVICE.

The honours which have fallen to our distinguished Past-Presidents may suitably be mentioned in this report; and we join with a peculiar sense of propriety in the acknowledgments rendered to their high services. Sir Alfred Keogh, our immediate Past-President, has been recalled to the Director-Generalship of the Army Medical Service; Mr. Dugald Clerk, D.Sc., has been elected to the presidency of the Royal Society of Arts; Mr. Balfour Browne, K.C., was selected by the Prime Minister to serve on the Committee of Inquiry into the Air Service of the Army; and Professor (now Colonel) Arthur Smithells has been chosen to undertake important chemical service, and the direction of an invaluable department of the Army's organization. Professor Harold Dixon has been acting as adviser to the Trench Warfare Department, and as an organizer of the Chemical Section of the Royal Engineers. He is chiefly engaged as Inspector of High Explosives for the Manchester area. The University chemical staff undertake the inspection and analysis of all the high explosives manufactured in this large district. To all these we sincerely offer our warmest congratulations.

Our members, too, have, apart from their adopted professions and ordinary occupations, taken their rightful place in the larger activities of the community. Several are presiding over the work of the local Munition Committees; many have placed their special knowledge and experience at the disposal of the Ministry of Munitions; while all are doing whatever lies in their power to forward the commercial superiority of this country, and to ensure that, as far as it may be possible, the right conditions shall be created to provide a sound basis for the industrial life of Great Britain after the war.

COMMITTEES ON BRITISH TRADE AFTER THE WAR.

In this connection, I desire to report that correspondence has taken place with the Board of Trade relative to the Committees that have been appointed to consider the position of certain staple British Industries. The following letter was written on behalf of your Society:

The President of the Board of Trade,
Whitehall, S.W.

Sir,—The attention of the Council of this Society has been drawn to the statements in the Press regarding the appointment of Committees to consider the position of certain branches of British trade after the war, with special reference to international competition, and to report what steps (if any) are necessary or desirable to safeguard that position.

We notice that one has been formed for the electrical industry; and we desire to ask, in view of the magnitude and national importance of the industries which this Society represents, if a Committee for the consideration of our position could be appointed.

This Society represents nearly the whole of the firms engaged in the supply of the necessary plant and apparatus both for the manufacture and distribution of gas. The capital of the members of this Society would aggregate to many millions; while the total capital involved in the whole of the gas industry is, as you will be aware, in the neighbourhood of £200,000,000.

Our Society is most anxious to open-up business in Russia and other centres where German competition has hitherto been very strong. In South America and our Colonies, it has been the experience of the members that their trade has been made extremely difficult by the inroad of German competitors, and, in many instances, has been so severely handicapped as to almost preclude the possibility of remunerative trade.

We feel that we have excellent grounds for the request that we are making, and shall be very glad indeed to send further information, or to wait upon your department if desired.—Yours faithfully,

H. M. THORNTON,
Chairman, Society of British Gas Industries.

In reply to our letter, the Secretary and myself were given an appointment to interview the Commercial Department of the Board. We were most courteously received; and our statement was listened to with every consideration. The Board promised attention to our suggestion to appoint a representative Committee, as in the case of the electrical, textile, and engineering industries, and congratulated us on the fact that our Society by its organization virtually constituted such a Committee. Although we are at present without the official dignity that would attach to a Committee set up by the Board, we appreciate the compliment paid to us. We are asked for the time being to prepare "a full and detailed statement" of any subjects which, in our opinion, require Governmental attention to protect and forward the interests of our industry after the war; and we are assured that "most careful consideration" will be given to it. The statement for presentation to the Board is now being considered by your Council. The co-operation of the new National Gas Council will be asked for, so that a complete and representative statement of the position may be prepared. The assistance of every member of the Society is wanted in this important matter; and I am sure that much valuable information and many relevant suggestions will be sent in.

GOOD RESOLUTIONS AND ENEMY FIRMS.

May I say how we welcome the vigorous attitude adopted by Mr. A. M. Paddon and his co-Directors, as well as Mr. A. F. Phillips and others who have declared their determination on behalf of their companies to purchase in future only from British and allied traders, or from neutrals in the unlikely event of the two former being unable to supply the requirements—enemy firms being rigidly excluded.

The Manchester Corporation have also shown their support to this movement by adopting as a standing order:

> That no contract should be entered into in future with any person of German or Austrian nationality; that no contract should be entered into with any firm or compny whose subscribed capital, whether by way of shares or otherwise, was held or controlled to the extent of one-third, or upwards, by persons of German or Austrian nationality.

In this connection, it will be opportune to refer to the resolution passed by your Council on July 11 last:—

> That the Council of the Society of British Gas Industries consider it imperative for the welfare of British traders that the whole of the 400 firms referred to recently in the House of Commons as being of enemy association, and any others whose capital, whether by way of shares or debentures, is, or was at the commencement of the war, of substantial amount, should be wound-up under the Trading with the Enemy Act.
>
> That a copy of this resolution be sent to the Prime Minister, the Home Secretary, and the President of the Board of Trade.

Copies of the resolution were duly forwarded, and acknowledgments have been received.

Trading with Australia.

The strong and enlightened views expressed by the Rt. Hon. W. M. Hughes, the Prime Minister of Australia, during his visit to this country and the drastic measures taken in the Commonwealth in regard to enemy firms will be in your minds. Advantage was taken of Mr. Hughes' presence here to arrange an interview. His unfortunate illness prevented him keeping the engagement; but, at his request, a statement was submitted in writing embodying many subjects suggested by members.

I had the pleasure of a long interview with Mr. Milne, Special Trade Commissioner of the Australian Commonwealth; and the particulars I was able to give him of our members' work and products were received with evident interest; and he assured me that if, on his return to Australia, members would write him for any information they desired, or lay before him particulars of their proposals in regard to Australian trade, it would give him great satisfaction to be of any assistance that would enable them to supply their commodities to his country, particularly if they supplanted goods hitherto obtained from enemy sources.

Association with the London Chamber of Commerce.

Our Society has recently joined the London Chamber of Commerce; it being felt that this connection would assist in keeping us abreast of the important commercial movements which are being made at this time. Another valuable advantage will be found in the knowledge which this Chamber—with a membership representing the foremost commercial and trading interests of the country—will receive of the work of the gas industry. At an interview with the Secretary of the Chamber, I took the opportunity to explain in considerable detail the national importance and the valuable services of the industry, and left with the impression that our status had been raised in the view of the Chamber, and that the research work and technical progress made by our members would be appreciated at their true worth. Too much stress cannot, I think, be laid on the value of thus coming into touch with important sections of business and commercial life, so that knowledge may be disseminated as to the unique position we occupy in the national welfare.

Notes on Useful Work.

Among the other activities of the Society should be mentioned: The Life of Gas-Meters Research Committee is continuing its valuable work; and a preliminary report of the Joint Committee was presented at the meeting in June last of the Institution of Gas Engineers.

The revision of the standard conditions of contract was the subject of a conference between a Joint Committee of the Institution and our Society, the result of which has been very satisfactory; and it is hoped shortly to issue the revised conditions.

The Refractory Materials Committee is continuing its good work; and the Advisory Committee of the Privy Council have made a grant for scientific and industrial research—this contribution being supplementary to the two grants of £50 each made by the Institution and our Society.

During the half-year under review, Professor John W. Cobb, Livesey Professor at the University of Leeds, has issued his annual report on the work of the Department of Coal Gas and Fuel Industries (with Metallurgy). Although the war has necessitated an extension of the activities of the department outside their ordinary range, research of service to the gas industry has been carried out particularly on coal-tar, carbonization, and ventilation, and the representatives of your Society on the Livesey Advisory Committee continue to take a lively interest in the work that is being done. As a Society we are particularly glad to see the influential position which the Leeds University occupies in connection with important work concerned with the prosecution of the war and the extent to which the Department under Professor Cobb has been utilized by the Ministry of Munitions during the last twelve months.

A deputation representing the Institution of Gas Engineers, the British Commercial Gas Association, and the Society waited upon the Board of Trade Committee on Reserved Occupations and Lord Moulton of the High Explosives Department in regard to the exemption of essential men in the distribution and administrative sides of the gas industry. Greater success would undoubtedly have attended our representation if the industry had been better organized.

The matter of the pooling of railway waggons has been referred to in previous reports; and it is satisfactory to note, in view of the Society's representations, that a provisional agreement is now in force between certain of the Railway Companies, under which certain waggon stock owned by the Companies individually are deemed as common stock of the Companies concerned. We hope members are experiencing the benefit of this arrangement.

A matter of great importance to the industries of this country is the recommendation of the Board of Trade Departmental Committee on Financial Facilities that a new Bank, to be called "The British Trade Bank," be established under Royal Charter. This will be of special interest to our members after the valuable information they supplied to the Council last year in reference to credit facilities given by British banks and which was duly forwarded to the proper quarter.

The Society's prizes to successful candidates in connection with the City and Guilds of London Institute Examinations in "Gas Engineering," "Gas Supply," and "Gas-Fittings" have been awarded. [For list of winners, see "Journal" for July 25, p. 154.] From the acknowledgments received from the recipients, these prizes are very much appreciated; and in these days when educational and technical training are so important, we feel that t is a privilege to give encouragement in this direction.

Work of the British Commercial Gas Association.

The British Commercial Gas Association, to the funds of which we contribute substantially, has continued its good work, particularly dealing of late with the uses of gas in industry—a direction in which lie untold possibilities. It is difficult to appraise at its true worth the high standard which the Association maintains in its beneficent activities. The standard set at the very commencement was ambitious. It has not only been reached, but surpassed; and we who know the aims and ideals that animate those chiefly responsible for its direction can foresee a wonderful career of service and of usefulness.

Organization of the Gas Industry.

I must now, in conclusion, refer to the most important subject that has engaged the attention of your Council during the past six months—namely, the organization of the gas industry. Members will now be acquainted with the general outline of the scheme adopted, to which your Council by a majority vote agreed. The resolution upon this subject (which was framed by Mr. D. Milne Watson, Managing-Director of the Gas Light and Coke Company) is as follows:

> That the following bodies form a National Gas Council:
>
> The President, Vice-Presidents, and Council of the Institution of Gas Engineers.
>
> The President, Vice-Presidents, and General Committee of the B.C.G.A.
>
> The President and Committee of the Gas Companies' Protection Association.
>
> The President, Vice-Presidents, and Council of the S.B.G.I.
>
> That each of the above-mentioned bodies shall have the power to nominate nine (9) representatives from the Council, and that these combined form a General Consultative Committee.
>
> That each of the first three above-mentioned bodies shall have the power to nominate four (4) of its members who combined shall form an Executive Committee consisting of 12 members. These shall be selected from the General Consultative Committee appointed by the first three above-mentioned sections of the National Gas Council. Each member must be a representative of a gas undertaking (municipal or company).
>
> That in dealing with special matters or with interests not directly represented on the Executive Committee, that Committee shall have power to co-opt for that purpose any member of the four bodies composing the National Gas Council or any other person.

Considerable criticism has naturally been directed at the clause regarding the Executive Committee. Certain suggestions were put forward by the seven representatives delegated by your Council to negotiate on behalf of the Society; and in the hope of reaching an agreement the following proposals were made:

> That the following bodies form a National Gas Council:
>
> The President, Vice-Presidents, and Council of the Institution of Gas Engineers.
>
> The President, Vice-Presidents, and General Committee of the B.C.G.A.
>
> The President and Committee of the Gas Companies' Protection Association.
>
> The President, Vice-Presidents, and Council of the S.B.G.I.
>
> That the Associations above-mentioned shall each nominate seven representatives to form a General Consultative Committee to deal with matters of general interest and importance.
>
> That a Committee of the National Gas Council shall be formed which shall consist of twelve members, representatives of gas undertakings (municipal or company) to deal with subjects which are recognized to be connected solely with gas affairs.
>
> That the General Consultative Committee or the above Committee shall have the power to co-opt for special purposes any representatives from the National Gas Council or from the four bodies above mentioned or any other persons.

These were, unfortunately, found after protracted negotiations to be unacceptable; and while some may feel that the concessions for agreement should not have been expected to come entirely from our side, it was decided by your Council, on patriotic grounds, and to obviate division in the industry during the present situation, to accept the scheme for the duration of the war only.

The following was the resolution passed by your Council:

> It was agreed by a majority of the Council that the proposals of Mr. Milne Watson for the organization of the gas industry be accepted as an emergency measure for the duration of the war only; the position of the Society to be reconsidered as early as possible after the war.

By all broad-minded and progressive gas men, the formation of the National Gas Council can only be regarded as the beginning of a much larger and more comprehensive policy. Looking back on the last few years, it is with deep satisfaction that we can view the gradual but continuous growth of co-operation, and the realization of the interdependence of, and the benefits of mutual assistance between, the gas engineering profession and the manufacturers. This reminds us of words used by Sir Corbet Woodall, in his Presidental Address to us in 1913; and they will bear repeating to-day: "Although the differing characters of the busi-

ness and professional relations of the two organizations demand independent recognition, yet the major interest and purpose of both—namely, the welfare and progress of the gas industry itself—are the same."

It is because signs can be observed of the full recognition of the force of Sir Corbet's wise words, that we believe, on the resumption of normal conditions in this country, the existing organization of the gas industry will be developed on lines more acceptable to the views of our members. Much will depend on the force of influence which the Society is able by its actions, and by the part it plays in the common weal, to exert. That influence is steadily growing; our work gains in volume, in variety, in importance, and in its contribution to the advancement of the industry. And there is wider and still wider scope for our activities in the years that lie immediately ahead. There will be problems of labour and of capital, and of much else, in the solution of which we must take an effective part. The community will be called upon to take a greater interest in the collective life of the people. Our resources, all pooled for the purposes of the war, must still continue united for the victories of peace. To meet the heavy burdens imposed by the war expenditure, scientific organization will be needed, greater production will be essential, and the old restrictions on output will, we trust, pass away for ever.

These are but a few of the topics that concern us, and which cross the mind as we glance into the future, when the war will be but a vivid memory. I believe it is the earnest desire and intention of every member that in the solution of these vital problems and in the shaping of these new industrial conditions our Society shall take a worthy part.

Trading with Enemy Firms Should be a Disqualification to Membership.

Mr. Percy F. Holmes (Vice-Chairman) said it was with the greatest pleasure he rose to make a few remarks in support of their worthy Chairman's report on the work of the past six months. Although the report only took a short time to read, the work had taken up a tremendous amount of time, and claimed considerable thought on the part of the members of the Council, and especially of the Chairman. [Hear, hear.] He must take this opportunity of expressing his regret that—owing to the considerable distance between Huddersfield and London, and the short notice that had to be given in making arrangements in connection with the negotiations regarding the National Gas Council—he had been unable to give Mr. Thornton the assistance he should have liked to have done. There was one matter in the report which he really had considerably at heart. It was under the head of "Good Resolutions and Enemy Times." He thought this was an opportunity for them as the Society of "British" Gas Industries to make some stand—some drastic stand—in the same way that Mr. Paddon, Mr. Phillips, and the Manchester Corporation were doing. Some time ago, as the members would probably remember, there were difficulties in connection with the Society in regard to one or two firms who since the commencement of the war had, he believed, continued to be members of the Society—much perhaps to the dislike of certain firms, among whom he included his own. His feeling was that they ought to make it absolute that the membership of the Society should carry with it an obligation—or rather that the rules should be so altered that any members trading with enemy firms should thereby be disqualified from continuing his membership. They were all directly or indirectly hurt by this abominable war, which had been running now for over two years. So far as he could see, every one of them would be affected not only at the present time, but for years to come. Therefore he should like to put this forward in the strongest form, that they as members of the Society should make a compact now that they would not do any more business with enemy firms as long as they engaged in business at all. The only objection was that sometimes they could buy cheaper from Germany than in England. He thought the last two years or so had proved to them that the making of money was not the greatest thing in this world. [Hear, hear.] And if they could, by some means, stamp Germany out from doing further business with this country, they would have achieved something which would be, at any rate, one good result of the war. The only other matter upon which he wished to speak just now was the National Gas Council. They had perhaps not realized quite the representation that they set out in the hope of obtaining. But he could assure the members that Mr. Thornton had worked in connection with this matter in a manner that it was not possible for anybody else to have done. He had certainly achieved what he (Mr. Holmes) at one time thought was absolutely impossible. They were, in the first instance, met with all sorts of objections. But they had gradually followed certain lines; and, as was stated at the end of Mr. Thornton's report, they had only accepted the result for the duration of the war; and they had pursued a dignified course. The members had only to refer to the technical journals that had appeared since the conclusion of the arrangement to see that the Society was standing in a good position in regard to this matter He moved the adoption of the report.

An Unjustifiable Want of Confidence.

Mr. J. W. Broadhead, in seconding, congratulated the Chairman on the able report he had presented to them, and which had been unanimously, and without alteration, accepted by the Council at the meeting held that morning. The report did not reflect the large amount of time the Chairman and the members of the Council had devoted to the different subjects as they had arisen from time to time, and particularly during the last six months in relation to the National Gas Council, with the outcome of which he did not think that any member of the Society could be entirely satisfied. The non-acceptance of Mr. Thornton's amendment, which was discussed *in camera*, and which non-acceptance excluded the Society from representation upon the Executive Committee, showed a want of faith and confidence in the members of the Society which was not justified, more particularly when they remembered how pleasant their relations had been with the British Commercial Gas Association and the Institution of Gas Engineers. He trusted, however, that Alderman Phillips's hopes would be fulfilled, and that time would bring about such alterations as would make it unnecessary for their Society at the end of the war to reconsider their position. Their feeling at the present time was certainly very strong against being associated with a body which did not want them on their Executive Committee. The members of the Society were all principals, and, as business men, they felt they could be of service on the Executive Committee, and as business men they certainly would not wish to have anything to do, in any shape or form, with matters which did not directly concern them. They had entered into this compact against their better judgment, in the hope that the future would rectify things. During the past six months, another important subject had had careful consideration—the revision of

The Standard Contract Conditions.

Now in future the clauses would be known as the standard "conditions" of contract—town clerks, who had to deal with these matters, understood the term "conditions" better than they did the term "clauses." In connection with this, he should like to emphasize the agreeable and pleasant manner in which the Institution had entered into their arguments, and listened to them with regard to the different improvements they had had to suggest. It must be pleasing to the members to know that every important alteration the Society had suggested had been, practically entirely, accepted by their friends on the other side. On the other hand, alterations suggested by the Institution and by their lawyers had been entirely accepted by the Special Committee of the Council of the Society who were left to deal with the matter. The outcome was that the standard conditions of contract were now much fairer—were, in fact, quite fair—as between buyer and seller, than they were before. In future, contractors would not be responsible for foundation work designed and executed by gas engineers, and for which in some contracts heretofore the contractors were made responsible. In future, the cost of agreements drawn up by gas undertakings was to be borne by the undertakings, and not by the contractor. One important alteration and addition to the clauses dealt with the gauging of gasholder sheets and plates. He was pleased to be able to say that the Special Committee of the Institution of Gas Engineers had agreed to accept the rolling margins that they, as contractors, had to accept from the rolling-mills. If in future sheets were found to vary slightly in thickness or in gauge, not thinner or lighter by more than 5 per cent., they could not be rejected by the engineer, as had been his power in the past. He trusted that, before many weeks had passed, the members would have a copy of these altered standard clauses, and that those who had occasion to use them would religiously adhere to them, seeing that they had been approved by both buyer and seller.

Advantages of Chambers of Commerce.

Alderman F. Templer Depree remarked that, although the report did not occupy much space, the subjects referred to in it had entailed an enormous amount of work, and there was still a large field open for the activities of the Council. In one part of the report, Mr. Thornton had drawn attention to the question of association with the London Chamber of Commerce. He (Mr. Depree) felt that the association of their Society with Chambers of Commerce, consisting as they did of representatives of all the big traders throughout the country, was a very important matter, and would enable them to still more effectively carry-on the work of the Society. Most of the members no doubt belonged to one or other Chamber of Commerce in the country; and if they were all as successful in connection with various alterations and improvements in trade as had been the Exeter Chamber of Commerce, they had done very well. There was considerable scope for Chambers of Commerce; and, necessarily, if the Society were connected with the London Chamber, the members would have the benefit of this. In Exeter, they had the advantage of having as Member of Parliament the Society's President, the Right Hon. H. E. Duke, K.C.; and if they wanted anything put forward, he could, as the members were aware who were present at the last meeting of the Society, put forward anything in a tolerably forceable manner. The appreciation in Parliament of Mr. Duke's ability was shown by the fact that the Government had asked him, and he had agreed, to take a most important position in connection with the work of the country. Mr. Thornton had mentioned that the country's gain had been the Society's loss; but he (Mr. Dupree) knew Mr. Duke well enough to say that, in connection with Chambers of Commerce and their Society, if there were matters that they wanted directly brought forward, they had only to appeal to Mr. Duke to gain his hearty sympathy and generous support. One other point as to

Education.

The Society were offering prizes to successful candidates in the gas examinations, and a list of the prize winners was given in the

report; so that they were doing what they could to further the educational part of the industry. With the Chairman, he had the privilege of being present at the last meeting at the Leeds University; and to those gentlemen who had not had an opportunity of seeing what was being done there, it would be a matter of considerable interest to observe how the department which commemorated the work of Sir George Livesey was being conducted to the advantage of their industries. Wherever there was an opportunity of furthering the interests of the trade from the technical and educational point of view, the work was in very good hands at the Leeds University, and was in the current circumstances being pushed as far as possible. The present time was an unfortunate one for all these innovations. Their first duty was to get the war finished; and when this was over, they would then be able to turn to some of these quieter studies with perhaps a little more vigour. That good work was being done, he felt sure. He was struck also by the enormous progress the Chambers of Commerce were making with regard to education for business purposes. He was present at the Mansion House when the Lord Mayor was giving away the prizes; and they had five or six young students coming forward to receive prizes for proficiency in the Russian language, and others in Spanish. These were matters the educational bodies of the Chambers of Commerce were taking up; and they as a Society might do the same. Foreign languages were going to be of great importance in future. They must take a leaf out of the book of, he would not say, their friends the Germans, but of the "gentlemen" who had been going all over the world, and had gained by their trading immense advantages.

Trade Development by Individual Action.

Mr. Sam. Cutler, jun., also congratulated the Chairman on the work accomplished during the past six months. The courtesy and tactful way in which the Chairman had conducted the negotiations leading to the establishment of the National Gas Council, and the association with it of the Society, deserved the greatest credit. There had no doubt been difficulties—difficulties which it had been foreseen might crop up, and probably difficulties which were not foreseen. Still these had been got over; and he thought the Committee who had been assisting the Chairman in dealing with this matter had gone about it in a way—putting completely aside their own individual interests in the interests of the whole—that was beyond all praise. So much for the front that they presented to the gas industry. There were other matters in the Chairman's report which he thought appealed to the members as they did to him. One of them was "Trade after the War." They had heard a great deal about this in public meetings; and the Press had been devoting much space to the subject. He had also lately received from the chairmen of two of their sections circular-letters upon the same question. He was afraid he was going to take a contrary view to these letters, because, to his mind, this national trade organization was going to be, to put the point in perhaps rather strong words, a waste of time. Committees had been elected with whom it was suggested they should meet, and discuss the details of one another's business. But the time would be better spent if they went about the matter from the individual point of view, and caught some of the trade which was ready to fall into their hands by the force of the circumstances of the war. Now what did the Chairman say in the paragraph of his report headed "Good Resolutions and Enemy Firms." Had they not got protection there in all its glory? The Chairman said that Mr. A. F. Phillips and Mr. Paddon had supported and passed resolutions, in connection with a large number of gas companies, excluding trade with Germany and other enemy nations. What more did the members of the Society want? But were they to sit down comfortably in the shelter of these resolutions and seek no further business, because there was no competition at home with enemy countries? Trade after the war, in his opinion, more or less referred to trade in the world's markets. This was what they had to look after. It was to him a most incomprehensible thing that Britishers who were the best business colonists in the world had proved themselves the worst of commercial travellers. Take as an example the Continental trade of the gas industry. To his certain knowledge this had been confined to a very few. There was Holland, for instance. Once upon a time, the whole of the Dutch gas-works were built of English materials. To-day, the Germans had captured the lot. Why should this be so? Holland was equally placed between England and Germany; and it was surely cheaper, in normal times, to deliver goods by sea than by rail. They were placed in much the same position in regard to duties. The British manufacturers were there first; but whether they liked it or not, they would now find they would have the greatest difficulty in getting the Germans out of Holland again, because they had not only followed like the British contractors the engineers' specifications, but with enterprise they devised and proposed much more modern things. Without going into details, he thought his colleagues in the gasholder section would appreciate the fact when he stated that quite recently the Germans came in and took a contract for a large gasholder tank, 180 feet diameter and 40 feet deep. It was an annular tank; and the Germans were so clever in disposing their material that the thickness of the inner wall plates was only 6 mm., or about ¼ inch. On the Continent, too, they had also been able to design tanks for gasholders ranging from ½ million to 4 million cubic feet capacity in the shape of a bottle; and the thickness of the plates was only ¼ inch. They would appreciate what a saving of material this meant. He had just spoken about Holland. Let them take another country—Italy. It was not in any boasting spirit that he said this, but because it was an illustration of a point he wished to enforce. He had had the privilege of going to Italy at intervals during the six years preceding the war, and picking up there a good deal of work. He might say that he obtained more work during those six years than all the British gas-works firms had ever previously carried out in Italy. Now he had never, on any single occasion, run up against one of his British competitors in Italy. He was a member of the Italian Gas Association, as well as of the Dutch Association; but never in the past ten years had he ever in those countries met his home competitors at these meetings. One speaker had referred to the learning of languages; but what was the good of that, if they did not go and meet their potential Continental customers on their own ground? National trade organization, chambers of commerce, and all that sort of thing did not cover individual effort. His idea was to prepare themselves for dealing with their business in a scientific way. Let them have as many universities as they liked, and as much technical research and experiments as they wanted. But they did not want to waste effort and time talking about each other's business. There was more to be done by individual effort.

Courteous and Gentlemanly.

Mr. W. D. Helps said the Chairman was particularly happy in the opening of the report on the half-year's operations, which had been carried on under very difficult circumstances. Mr. Thornton was clearly an optimist in regard to the war. He (Mr. Helps) thought it was not quite fully realized that every British firm connected with the Society had been more or less of some good service to the country, and that many of the members had sons fighting, and some had lost their sons. They had done their share; and it was a very proud position. As to the new National Gas Council, he felt quite sure every member of the Society was smarting under (if he might so call it) the rebuff received from the other three organizations. He could speak pretty freely on this matter, because, though he was not one of the seven, by he thought mere accident, he got roped-in on one or two occasions with their Chairman at these meetings; and he had great pleasure in doing what he could to assist. This National Gas Council was one of the most important things upon which they had to keep their eyes, in spite of the remarks of their friend Mr. Cutler. In his (Mr. Helps's) view, they must have their National Gas Council to keep the industry right not only throughout the length and breadth of the land, but in the Colonies and other foreign parts. They must in the gas industry have a good strong front of all sections, in order to meet anything that might in future arise to affect their interests. So far as the Society's seven representatives were concerned, he was quite sure they had done their duty; and they had done it led by the resourcefulness and tactfulness of Mr. Thornton, who upon certain occasions had the courage and the manliness to speak for the Society, quite irrespective of anything appertaining to his own business. He had never looked upon their Chairman as a fighting man; but he had been very much awake at some of these National Gas Council meetings, and had fought heroically for the Society. Mr. Thornton had not only made friends by the tactfulness and carefulness with which he handled the matters, but he had made stronger friends for the Society. They would have to "suck the hammer" a bit in regard to not being on the Executive Committee—that was the Committee who would have to spend the money. When the Committee were spending money, it was mentioned the other day that they would co-opt members of the Society. [Laughter.] They were also told—and it would be pleasing to the members of the Society to know this—that they had behaved themselves right through the meetings, and had been very courteous and gentlemanly, and had had no "axe to grind." As a matter of fact, they were all "axe grinders." The gas engineers wanted to push out the electric light, and the members of the Society wanted to push in gas plant and gas-consuming appliances.

An Important Understanding.

One point which was a little consolation in regard to their omission for a time from the Executive Committee, was this: Their Chairman put the question—and it was a very strong point, when they found they could not get their way any further—and obtained the clear understanding that the Executive would not do anything whatever that concerned their Society without representatives of the Society were co-opted. On this point they had the assurance of Mr. D. Milne Watson and others. It would also be understood that they had only agreed to the scheme for the period of the war. He did not think that certain men in high places, who did not represent sufficiently the general opinion in the industry, properly knew the members of the Society of British Gas Industries. But he had confidence that, when these men knew them better, they would come to them and say: "Society of British Gas Industries, we have made a mistake, and we want you to come on to the Executive Committee, and for that purpose we ask you to nominate your four members." They would unquestionably have their rights after the war. And to-day members of the Society might claim that they had not been wreckers, but builders-up of the industry as a whole.

An Illogical Position.

Mr. Charles Clare remarked that, when he read the opening of the report, he was inclined to think that it was their President who had started writing it, because it seemed to be in a political

and statesmanlike vein. But when he found there was no reference to Irish gas, he concluded that he had made a mistake. [Laughter.] However, he hoped at any rate that twelve months from now, they would be meeting in a different atmosphere, and that the dark clouds of war would have passed away. As to the National Gas Council, he should like to say this, that the position was illogical. Either the Society of British Gas Industries was an integral part of the industry, as implied by their late President (Sir Corbet Woodall), in his Presidential Address to the Society in 1913, or it was not. If it was an integral part, they had a right (as the Chairman forcibly put it the other day) to be included on the Executive Committee. But if the Society was not an integral part, then it had no right to be on the National Gas Council or the General Consultative Committee. What the Society had to do now was to strengthen itself as much as possible, and so enable itself to have a louder and stronger voice in the coming months than it had had in the past. In the report there was one point where Mr. Thornton spoke about a deputation to the Board of Trade Committee on Reserved Occupations. There he made this remark: "Greater success would undoubtedly have attended our representation if the industry had been better organized." He (Mr. Clare) thought so too. But it seemed to him that the Board of Trade and the Munitions Department were somewhat at loggerheads. One wanted one thing; the other something else. One said: "Burn as much gas as you can, because we want benzol and toluol." The other said: "No you must not burn as much gas as you can, because we want to save the coal from which the gas is made." He thought that not only was the representation of a united industry wanted, but they required a Minister of Commerce. He was strong on this, because he was sure it was a matter that would have to come forward. The Chairman mentioned Capital and Labour and British Trade Banks; but he (Mr. Clare) was absolutely certain that a Minister of Commerce would have to be appointed in the immediate future. If they had had such a Minister in these times, things would have been different from what they were now. Badged men had been taken away from certain firms; and those who had been so taken away, and were not considered fit for the Army, had been sent back —not to the firms from which they came, but to others. In connection with Section VI. of the Society (in which he was chiefly concerned), they found that there seemed to be an idea going round among the Government Inspectors that they should not have any new stoves at all to burn more gas. It seemed to him to be rather a peculiar notion. Then they had certificates "A" and "B"; but these certificates were now being divided up into half-a-dozen sections. With such things going on, he was not at all sure where they were. If these matters had been commercially dealt with in the first place, some of the anomalies would have been avoided.

Preference in Handling Orders.

Mr. Helps said there was one point he had omitted to mention which was important. It was that they were very anxious that the subscriptions to the "B.C.G.A." should be kept up. They did not ask for any increase of subscriptions, but they did want the members who did not subscribe at all to do so, so that they might get from the other side—that was, the ordinary side of the business—a promise of recognition that members would have preference rather than outsiders when orders were to be given out. The matter was brought up some years ago; but they did not then get any consideration over outsiders. But he thought they could get it now from the other side, if they made up their full complement of subscribers.

When Manchester Speaks.

Mr. Archibald P. Main said the report presented by the Chairman was significant in many ways—very significant indeed. With regard to trade after the war, he thought they should take the advice given them by the President of the Board of Trade, who told them that very shortly he would present a report upon the subject, and that it would be better to defer discussion until it was placed before them. As they all knew, there were at the present time Committees of some of the ablest men of the country sitting privately, and taking evidence. He had some extremely interesting figures the other day with regard to the export of coal and coke, and endeavoured to get permission to give them to the members of the Society. But he could not obtain the permission. However, they would all come out when the Committee's work was finished. To his mind, the most interesting thing in the whole report was the Chairman's reference to what had taken place in the Manchester Corporation. When the history of the war was written, he thought that the resolution passed by the Manchester Corporation would form one of the most significant parts. Manchester had always been a storm centre of English politics. Nature had plentifully endowed it with protection in the matter of a climate suitable to the cotton industry; and Lancashire had hitherto been very much inclined to say: "Bother you; I am all right." And they knew at the present time the Germans thought the Manchester Corporation was the only one that had any sympathy with them in the whole of England. In face of this, the Manchester Corporation had passed the resolution referred to by Mr. Thornton. That they should have done this was one of the most significant things that had taken place since the war started. He was inclined to think that after the war, some people would want to again start trading with Germany. When he heard of this, he would just take this little piece of paper out of his pocket with the Manchester resolution printed upon it, and say: "When Manchester has said this, there is no fear for the country."

Qualifications, Financial Interests, and Experience.

Mr. T. Glover (London) said the point in the report in which he was specially interested referred to the work done by the Joint Committee on the Life of Gas-Meters. On the face of it, it might appear that this was a subject which only interested one particular section of the Society. They had had he thought something like twelve or thirteen meetings; and it had been proved over and over again that there was not a single section of the Society which would not be affected in some way by the work that was being done by the Joint Committee. The first line the inquiry took was directed to the chemical side; and this went on for some time, until certain general facts were established, which involved every question connected with a gas-works from the time coal was put into the retorts until the time the gas was burned in the consumers' houses. Therefore, he thought that the support the Society had given to the investigation was valuable, not only to the members of the Meter Section, but to almost every member in the Society. The way they were received by members of the Institution was very gratifying; everything had been discussed perfectly openly as among equals. He had hoped that this would have formed a precedent which might have had some bearing on the question of the organization of the industry, upon which some of the other speakers had touched. There was one point to which possibly some of the other Societies had not given consideration. He was afraid the members of the Society were still being looked upon as more or less shopkeepers in a small way. But he thought, if those gentlemen (as they would do eventually) realized that the qualifications of the members of the Society—their training, their financial interests, and their experience in running the various businesses with which they were connected—were probably as great on the average as the qualifications, interests, and experience they themselves possessed, that it would not be long before they recognized that the members of the Society could give material assistance in many of their undertakings. He could only say for his own part that he quite endorsed the recommendations of the Council. They accepted the position under the present conditions, and hoped that, after the war, the whole thing would be reopened and put on a proper footing.

The Meter Committee and British Chemists.

Mr. Thomas Marsh asked whether the Joint Committee were yet in a position to find an Englishman with sufficient knowledge of chemistry and mechanisms to report upon the question of the life of gas-meters. If not, he was very sorry for this country. He should like to point out that, when the Society was formed, he was one of the three original members, and one of the points then made was that the new organization should be called the Society of *British* Gas Industries; and it was laid down that there should be none but British members. He understood, however, from the Chairman that there had been difficulties, some of which had arisen from Englishmen having been regarded as possible Germans. [Laughter.] He did not know definitely whether or not this was so; but what he should like to know was that in future an English chemist would collaborate in this meter inquiry work. If it were impossible to get an Englishman of sufficient ability, then he should like to hear of it. The meter originated in this country; and there was too much going to foreigners for this and that. He did not know the Germans were great inventors. They were great borrowers, and were great at the appropriation of ideas; they were great also at shoving themselves in where they thought they could get knowledge upon any particular subject. He understood that the chemist who had been engaged in this research had been to America. Did he go to America to get information for the Society, or did he go to tell them in that country about English meters? This question of the chemist was one of the things the Committee would do well to consider in future. He knew the Committee had worked well and hard; but he did not feel himself exactly equal to saying all he thought about the Society priding itself so much upon its patriotism, and upon its desire to trade in everything English, going out of the country to get an expert.

Suggested Gas Section of the London Chamber of Commerce.

Mr. George Hands remarked that the Chairman had mentioned that the Society had joined the London Chamber of Commerce. Several of the firms were members of it already; but there was no Gas Section, although there was an Electrical Section. When he joined the Chamber he asked what section they would put him in; and they said "Engineering" or "Electrical." [Laughter.] He replied that his business was purely gas. Were the Council thinking of approaching the London Chamber of Commerce with regard to having a Gas Section?

The Chairman said he might reply to Mr. Hands at once. In conversation with the Secretary of the London Chamber of Commerce, he (Mr. Thornton) particularly laid stress upon the desirability of gas being much better represented in the Chamber than it was. He understood the electrical side was particularly well represented. Of course, they could not expect the London Chamber of Commerce or any other Chamber to recognize them as an industry until they had shown themselves interested in the Chamber. The Society had only just become members; and

he thought the British Commercial Gas Association had, on his suggestion, also become members. He was hoping the industry would by degrees obtain its right position in the Chambers of Commerce, not only in London but elsewhere. If they persevered, he thought they would get at that result.

Protection Needed.

Mr. R. J. Milbourne said the point he wished to bring forward was the one raised by Mr. Cutler. He recognized that one of the greatest subjects they had in front of them, and with which they would be confronted at the conclusion of the war, would be their trade. Most of them—practically all of them—in the heavy section were now engaged on munitions. They were not allowed to proceed with their ordinary gas plant—such as gasholder tanks. When, however, the war was concluded, there would be a sudden stoppage of the munitions work they had now in hand. Therefore, it was very desirable, he thought, that the members of their Society, particularly the heavy section, should consider closely and very carefully the question of trade after the war. For the letter that Mr. Cutler had mentioned as having been sent out to the members of his section, he (Mr. Milbourne) was responsible; and he thought Mr. Cutler had read into the letter more than was ever intended. But from the excellent review Mr. Cutler had given them of their shortcomings, he thought that the letter was fully justified.

The Bottle-Shaped Gasholder Tank.

With regard to the new form of gasholder tank that the Germans had brought out, and which he thought they had erected very extensively in some of the Continental cities—that was the bottle-shaped type—he must say it was, in the first instance, due to an Englishman that this particular form was first introduced. He thought it only right to say that it was no doubt taken from the design and patent of Mr. F. S. Cripps—a consulting engineer very well known to the members. However, this particular type of tank did reduce very considerably the thickness of the material, as the strain throughout the tank from top to bottom was practically the same; and therefore the plates could be the same thickness throughout. But, on the other hand, the form of construction must, he thought, very considerably increase the cost of manufacture; and it seemed to him that if he had the opportunity of going thoroughly over the design, and placed the increased cost of construction and erection against the saving of material, that there would be very little in the German design. The ordinary tank was very easily constructed on the works, and plates could be used of large dimensions; whereas, with the bottle-shaped type, they would have to be bent, probably in a hydraulic press, or put several times through various and quite special rolls. So far as Germany was concerned, they did need some protection; and he did think it was incumbent upon the Society and similar Societies throughout the country to urge upon the Government the necessity of protection against their enemies. He felt that, as soon as the war was over, Germany would be fully prepared to attack the trade of this country with all the vigour that it had used in the past. Only by making their voice heard as loudly as possible would they get any assistance. Individually, they could do very little; but, as a Society, they must do all they could to urge the Government to adopt the proposals which were put forward at the Paris conference.

Exodus of Enemy Firms.

Mr. F. C. Tilley, referring to the question of enemy firms, said it had had a large place in the deliberations of the Council; and he was glad it had been so, because it had brought before the members in quite a regular way a very essential matter, and one which had been occupying the minds of many of them. In fact, several of the members had come to him in connection with the section to which he belonged, and asked, "What is the Council doing in this matter?" The question was referred to in the report; but he might tell them that it had been a matter of surprise to the Council to find out the number of enemy-connected firms in this country who were trading, and had been trading, largely in British names. Some of them had kept to their own nationality; and it had been very evident that they belonged to the country which had given them birth. But others had called themselves "British This" and "British That," and so had sheltered themselves—a large amount of business passing into their hands which, he was sure, would, in the ordinary way, have passed into other hands, simply because they had covered up their foreign identity. By bringing the names of different firms to the notice of the Board of Trade and other Government Departments, a good many had been closed up; and the Society could take some credit to itself for being the means of bringing about the dissolution of a considerable number of the firms now on the black list. There were still others about which they were not satisfied; but the Government unfortunately up to now seemed satisfied that they were British firms. Of course, the Society could not do anything more than keep before the Government Departments the anxiety the members felt that British trade should be carried on by truly British methods, and by those who were Britishers. They wanted the Acts of Parliament which now sheltered these people to be altered in such a way that trade might be freed from all enemy taint. Mr. Cutler had hinted that it was no use relying upon the Government clearing out the firms to whom they all objected. They must themselves take up those methods and adopt those plans that would bring prominently forward the merits of their own goods, and which goods they must use every effort to improve, even, if need be, by adopting Continental methods of manufacture. In themselves lay their own reward. They must help themselves and not rely too much on the Government. The Government were willing to assist; but they expected them to do the spade work themselves.

The Chairman said the discussion had been a most interesting one. Many points had been touched upon; and when the Press recorded what had been said, those who read the speeches would be very interested. As to the kind things that had been said regarding himself and the work he had done during the period he had been Chairman, this work could not have been accomplished to the extent it had been had it not been for the able support of the Council. The seven representatives of the Society had had a lot of work to do with regard to the negotiations for the National Gas Council. The Council had had to confirm all the "seven" had done; and the meetings that had been held and the occasions that they had had to meet on this and other matters had been more than usual.

The report was unanimously adopted.

The Representatives on the National Gas Council.

The Chairman said, arising out of the report, they had to elect nine representatives on the General Consultative Committee of the National Gas Council. The Council that morning had had the matter under discussion; and they felt that it would be the wish of the members that the seven members who had represented the Society in the negotiations should be at any rate seven of the nine members to represent the Society on the General Consultative Committee until the annual meeting next March. There was further work to be carried out; and these seven members were particularly well versed in what was being done, and to be done. Their friend, Mr. Depree, however, did not expect to be in London very much the next few months, and so desired not to be elected. This left six, and the three additional members—one to take the place of Mr. Depree and two extra. The Council suggested that the Hon. Treasurer (Mr. T. A. Braddock), Mr. Charles Clare, who was their first Chairman and now Hon. Secretary, and Mr. W. D. Helps should be, with the six other representatives, the nine members of the Society for the General Consultative Committee. If anyone else had any other nominations, they would have to ballot for the nine members. If the members did not feel it necessary to go through this formality, the Council would like to see the nine members suggested become the representatives on the Consultative Committee until March. If this was agreed to, the representation would be as follows:

Mr. J. W. Broadhead .
Mr. Samuel Cutler, jun.
Mr. Fred. J. West . .
M. H. James Yates . .
Mr. Percy F. Holmes .
Mr. H. M. Thornton .
(*Chairman of Council*)
} Six of the Seven Former Representatives on the Joint Committee.

Mr. T. A. Braddock, *Hon. Treasurer.*
Mr. Charles Clare, *Hon Secretary.*
Mr. W. D. Helps,

On the motion of Mr. J. W. Scott, seconded by Mr. Albert Glover, the nine gentlemen named were duly elected.

Increase of Annual Subscription.

The Chairman said there was one more matter—that was the question of the annual subscription. The subscription it was decided some time since should be three guineas; but it was now desirable that it should be further increased. Their Hon. Treasurer would like to say a few words on the subject.

Mr. T. A. Braddock remarked that the position of the Society's funds was very unsatisfactory at the present time. This was due principally to two reasons. In the first place, it was due to the success of the Society, which was constantly increasing its activities and widening the scope of its operations. It had initiated and supported research. Mr. Thomas Glover had told them something about this in connection with meters; and Mr. Albert Cliff, the Chairman of the "Fire-Clay Goods" Section, could tell them something about inquiries into refractory materials. This meant much extra expense. Another point was that in the earlier years of the Society considerable sums of money were derived from entrance fees. Now, seeing that most of the firms who were eligible for membership were members, they were feeling the loss of these entrance fees to a considerable extent. This meant that they were short of funds; and when any question came before the Council, they were harassed by ways and means. So far as the remedy was concerned, the Council could "cut their garments according to their cloth" by lessening their activities. They could jog along in a comfortable manner, and make both ends meet. One of the technical papers said the other day that the Society was an organization which was very much alive; and they wanted to continue to live up to this reputation. The Council therefore suggested that the subscription should be increased from three to five guineas. Their rules provided that no alteration in them should be made except at an annual meeting. The Council asked the members, however, to consent to the increase, and the firms who were not represented would be written to, and then the matter would come forward for confirmation at the annual meeting.

Mr. Cyril G. Davis seconded the motion; and it was carried unanimously.

Golf Cup.

The Chairman then presented to Mr. George Hands the silver

golf cup which he had won in the annual competition, together with a replica in silver for his permanent keeping.

Mr. HANDS heartily responded to the Chairman's kind expressions in making the presentation, and to the members' cordial endorsement.

THANKS TO THE CHAIRMAN.

A vote of thanks was passed to the Chairman, on the motion of Mr. CYRIL DAVIS. There was no need for a seconder, for the motion was passed at once with applause.

THE FUTURE OF THE COAL-TAR INDUSTRY.

In the course of the seventh annual congress of the Textile Institute, held at Leeds University last Thursday, Friday, and Saturday, Professor A. G. PERKIN, F.R.S., recently appointed Head of the Department of Colour Chemistry at the University, lectured on "The Future of the Coal-Tar Industry."

The lecture was primarily devoted to the dyeing and colour process side of the coal-tar industry; but the Professor deplored the migration of the industry in general to the Continent, after a brilliant rise in this country. It was common knowledge that the warnings of chemists had been ignored in the past; and after a lapse of forty years of indifference, we had begun to regard the matter as being of importance, and started to grapple with the situation. Whether many of us now fully recognized the colossal nature of the problem with which we had to deal, if we were really anxious to possess our share of this immense industry, was doubtful; and it was even certain, from public utterances since the outbreak of the war, that some of our eminent scientists had not yet fully grasped the situation. The matter as it stood before the war was not merely the loss of the dye-making industry—vast though that was—but those involving the manufacture of pharmaceutical products, pure organic chemicals, and all those industries to which synthetic organic chemistry applied. We had to face a competition in which our rivals had a forty years' start, during which the simplest processes had been revised in the interests of economy and chemical purity; and we had also to face the fact of keeping pace with new ideas and discoveries.

No doubt patent law and the duty on commercial alcohol had had an adverse effect; and great responsibility lay on our legislators in this respect. He was inclined, however, to think that, even had these impediments not existed, we should have been very little better off than we were at present. There was a dual blame on the industries concerned, and on the Universities and technical colleges. The industries had apparently not realized that, without continued research, advancement was impossible; and there had been lack of employment of capital in securing chemists. On the other hand, it had been suggested that chemists possessing the required qualifications could not be obtained here, and that, therefore, the blame lay on the educational institutions. He felt that had there been a demand, and security of tenure—as there was in Germany—and proper remuneration, the supply of men would have been forthcoming. It was unfortunately true that this nation in the past had greatly neglected science; but there had been a considerable improvement during the past two decades, although there was still a deplorable indifference and lack of enthusiasm which prevented the creation of the atmosphere essential to research work. Systematic co-operation between the Universities and technical colleges and the industries was the essential requirement.

In a discussion which followed,

Dr. M. O. FORSTER, F.R.S. (London), considered the trouble was largely due to our "lop-sided" educational system, which concentrated too much on the classical side and left our educated people without any knowledge or appreciation of science, and thereby kept money out of the industries. In Germany, there was at least a chemical atmosphere among the people. If the people there read in the newspaper of nitric acid, T.N.T., benzol, or picric acid, they had some idea what was referred to; but in this country the so-called educated people did not know what the words meant.

Professor W. M. GARDNER (Bradford Technical College) agreed with Dr. Forster's view, but said the real explanation must be very complicated, as it was noticeable that the position was much the same in such widely divergent countries as Britain, France, and America; and in America, as was well known, there was a good deal of public appreciation of science. The Germans had developed the coal-tar industry to such an extent in the past that no other country had been able to make any headway in it. Fortunately, this condition was broken down by the war; and the present was an opportunity that would probably never occur again, and must be seized.

Mr. OLDROYD (Rochdale) attributed the situation not only to a wrong educational system, but an economic situation which did not render it profitable for young men to launch out into the coal-tar industry. This industry was the key industry to the national existence, as well as to certain trades; and he thought the Government had gone through such an experience of late that the position would not be allowed to develop in anything like the same way again.

Dr. EVEREST (Huddersfield) thought the rock-bottom of the matter was the need for greater co-operation between the Universities, the technical colleges, and the industries. The Germans admitted that in the lines to which they put the whole heart the British were supreme, and he could see no reason why we should not be supreme in this industry if we put our backs into it.

Professor PERKIN, in reply, said he was an optimist; but they must not say to the British public that everything was all right, or they would sit down and do nothing. There was no industry in this country which was more difficult to recover than the coal-tar industry.

SIXTY YEARS AGO.

From the "Journal" of October, 1856.

Gas-Works Smells and Health.—The proceedings in the preliminary inquiry as to the alleged nuisance caused by the City of London Gas-Works, were closed on the 17th inst.; and before the present number is in the hands of the majority of our readers, it will be known whether the Commissioners of Sewers are willing to be led by the thunderings of the public press, and the "undercurrent of self-interest" so pointedly glanced at by the Deputy-Governor of the Imperial Gas Company in his last address to his constituents, or by the evidence produced before them. The case put forward by the police authorities has crumbled into dust under the unimpeachable testimony of the medical officer of the force. The memorial of 118 householders similarly disposes of the complaints of the few prejudiced and fastidious neighbours who re-echo the interested jargon of Mr. Delane and "The Times." We, however, should have been better pleased had the question been fairly raised whether the exhalations from gas-works are injurious to health. Dr. Letheby, and others of his school of physiologists, roundly proclaim that a "bad smell" is prejudicial to health, forgetting, apparently, that some of the most potent poisons have absolutely an agreeable odour, and that others are without smell. Will Dr. Letheby say that sulphuretted hydrogen is poison when inhaled in the City of London, and yet may be safely imbibed at Harrogate? And yet this is one of the absurdities to which his system of "nosology" leads. "Offensive to the smell" and "injurious to health" are, with him, synonymous terms; and, in expressing an opinion that "whether the effluvia of gas-works are or are not a noxious or offensive nuisance to the neighbourhood is a question of fact, and must depend upon the nature of the evidence adduced," the chemists consulted by the Gas Company have, in our opinion, shirked the chief question at issue. Indeed, Dr. Taylor, the only medical authority among them, confirms, to some extent, Dr. Letheby's assertions, as he tells us that "his opinion has been adverse to gas-works being constructed or situated near inhabited dwellings, especially when the works are on a large scale." The 118 householders who signed the memorial before referred to, are conclusive witnesses against the accuracy of Dr. Taylor's opinion in this respect; and it is to be regretted he should have so inconsiderately pledged himself to such a theory. Had he taken the trouble to inquire into the sanitary state of the persons employed in gas-works, he would have found it to be superior to that of most other trades, and that they enjoyed almost perfect immunity from cholera and other epidemics. A remarkable instance of this occurred some time since at Barcelona, where the populace, having noticed that none of the labourers at the gas-works were attacked with cholera, while the city was decimated with it, invaded the gas-works by force, and encamped there until the scourge had expended its fury. At New Orleans and Cincinnati the workmen have been similarly exempt from the ravages of cholera and yellow fever. These are startling facts, and well worth consideration by those who undertake to enlighten the public on medical jurisprudence.

Thermalene—A New Gas.

A gaseous mixture has been introduced by the Thermalene Company, of Chicago, Ills., as an improvement on acetylene for welding and cutting purposes. It is known as "Thermalene," was discovered by a Swiss chemist, and is produced by the decomposition of calcium carbide and hydrocarbon oils; the heat generated by the carbide being utilized to vaporize the oil. Phosphorous, ammonia, sulphuretted hydrogen, and other impurities are automatically removed by washing with water and the cooling effect on the generator of the evaporation of the oil. The new gas possesses characteristics that distinguish it from acetylene, oil gas, or a mechanical mixture of the two. It is appreciably heavier than air; and the specific heat is over one-eighth that of acetylene. At ordinary temperatures, it is condensed to a liquid by a pressure of 1400 to 1500 lbs. per square inch; and the liquid is said to be stable and non-explosive. The odour is soft and sweet, totally different from that of its components. The colour of the flame is white, but with a predominant proportion of the red and yellow parts of the spectrum; and the maximum flame temperature is 6500° Fahr. The high density gives it a greater body than acetylene, and enables it to mix more readily with oxygen. Not being so liable to explosion, it can be mixed with larger proportions of air, and the flame can be turned down without risk of back-firing. It can be used with advantage with a Welsbach mantle; and less gas is required for a given size flame. The upper and the lower explosion limits are respectively 30 and 12 per cent. At present, the Company are manufacturing four sizes of generators, to suit various requirements.

SOME EXPERIENCES IN SELLING GAS FOR INDUSTRIAL PURPOSES.

By A. B. Roxburgh, of Newcastle-on-Tyne.

[A Paper read before the North of England Gas Managers' Association, Oct. 7.]

It is hardly necessary for me to say that the old idea of a would-be consumer of gas going to the gas company cap in hand and requesting to be supplied with gas is just about as dead as the dodo. Generally speaking, the suppliers of gas are alive to the fact that their duty to the public does not stop short at giving a supply to such as may want it, but, as far as in their power lies, to see that the gas is used in the best possible way. Further than this, there is an old saying—but nevertheless true—that the eye only sees what it has been taught to look at; and so the progressive gas authority does not stop at seeing that gas is employed properly according to the idea of its uses formed by a consumer, but endeavours to enlarge the sphere of its operations by a process of education as to its many economic possibilities. I use this qualifying language because, perhaps to a greater extent than the majority of businesses, the element of permanency is a necessary one; and any use that is not economic is bound not to be permanent.

In any gas salesman's experience, each order is almost bound to be twofold—first, the order for the apparatus (presumably gas consuming) itself, and, second, the gas supply; the former an immediate and temporary object, resulting only in a small once-made profit, or perhaps, under special circumstances, none at all, and the latter the real and hoped-for permanent one, recurring quarterly, upon which and upon similar transactions is based the progress of the gas undertaking he is connected with. These are, in my opinion, fundamental principles, and should be prominent at all times in the mind and aspiration of the seller of gas. Admittedly the good will of a consumer has something to do with the matter, and its value cannot well be over-estimated; but, sooner or later, any use of gas which is not an economic one will stop.

Of course, coal gas can be used for almost any purpose where heat is required. The point to be determined, however, is that at which it ceases to be economical; and the running must be taken up by some other form of fuel, be it gaseous, liquid, or solid. In determining this point, other things than actual cost of fuel enter; the most important being time and convenience. I have recommended many installations where, from a point of actual cost of fuel only—say, gas *versus* coal—gas seemed quite hopeless; and yet, all things considered, the job has been a brilliant success with gas. There was one case I remember very well. A gentleman who had replaced coal with gas as a heating medium was trying to "pull my leg" as to his running costs. Fortunately, I happened to know to what his account amounted; and it was very reasonable. So, after seeing that his attempted joke fell flat, he stated: "Well, it would not matter what it cost, after using gas we could never go back to coal, the results are so much better and the labour so much less." On the other hand, another job we tried—and this at the customer's suggestion and request, and against my own judgment and advice—the cost of gas was altogether too high; and its use was quickly discontinued.

At the risk of labouring the point, I wish to emphasize the necessity of the salesman gaining the most accurate information regarding any job he may have to advise on, and then only recommending the use of gas when, all things considered—and in nearly every case there are many factors—according to his judgment, the use of it is an economical proposition for the purpose under review. The possibilities for the use of gas are manifold; and the first thing for any seller of gas to do is to fully realize this fact.

The appliances which are the media for the use of gas may be divided roughly under two headings. First, that for which makers cater and issue catalogues, so that the only thing to do is to go through so many trade lists and recommend that which appears to be the most suitable, and putting the maker into direct negotiation with the consumer—a policy that I very much favour—or getting the order and reordering from the maker; and, secondly, that necessitating a special design, either because a similar job has not been tackled previously, or because it is of such a nature that the consumer can best do most of the work himself, and the actual value of the burners used would not recompense a maker for the trouble he would be put to in preparing details. The former cases are easily handled, and, with one or two makers at any rate, if the order is worth having, the gas authority can safely leave the matter with them to see that it is placed. Cases of the second type are not so easy; and require certain imaginative and inventive capacity on the part of the gas salesman.

Special Processes.

I hope that the few instances I am able to give may prove of interest to you. The first job that I will mention may be fairly described as international. The apparatus had been supplied by a German first (this was before the war). It was fitted with burners of American manufacture, and was for the purpose of pasteurizing (the idea of a Frenchman) light beer made in Scotland, and I presume was to be drunk by Englishmen, with perhaps a few Irish thrown in. The firm had the apparatus erected; and it proved an absolute fiasco. The representative of the brewers lived near me, and told me about the matter, asking me if I could do anything. I learned that to make a good job of the beer, it had to be raised from ordinary temperature—it was winter time, and probably 40° to 45° Fahr.—to 160° Fahr. in thirty minutes, maintained with accuracy at that temperature for twenty minutes, and then allowed to cool-down. The apparatus consisted of a large rectangular tank with fairly tight covers, and fitted with a grid to support the bottles about 2 inches from the bottom of the tank. About 1 inch of water was put into the tank.

On going into the matter, and observing the way the burners acted and the theoretical amount of heat required to perform the necessary work, we judged that it was impossible to burn enough gas with low-pressure burners, and some form of pressure, either air or gas, or both, was necessary. On account of simplicity, high-pressure gas was chosen; and all the heat required was readily obtained. The burners and injectors were made in our own workshops, and the plant is still working satisfactorily. I should perhaps mention that the manufacturers of the plant had omitted to allow for the weight of the bottles themselves; and before the plant could be fairly put to work the bottom had to be strengthened with angle iron.

Before tackling the job, we worked out the amount of gas on a theoretical or B.Th.U. basis, allowing for inefficiencies and heat losses; and the actual results were quite as expected. It may be interesting to add that the brewers of the beer stipulated that two bottles out of each batch should be sent to them for examination, and that at the commencement, before the control was fully mastered, they detected that 168° Fahr. had been reached. It was found in practice that at first the rise in temperature was slow, accelerating very much in the later stages, particularly between 150° and 160° Fahr. This is because some of the water in the bottom had been turned into steam in the earlier stages, yielding up its latent heat in the latter. Very little gas is required to maintain at 160° Fahr.; and it will be readily granted that gas is the ideal thing for such a job, being capable of such minute control. A local brewery has since been fitted up with a similar apparatus, only much larger, for dealing with stout; but, on this occasion, the whole of the plant was British.

The next job I will describe was for dealing with something not quite so palatable as beer—linseed oil. The process had previously been carried out, rather unsatisfactorily, with solid fuel, and the firm desired to improve their product. The requirements were to raise 50 gallons of raw oil slowly from atmospheric temperature to 212° Fahr., thus driving off all moisture, and then to raise it as quickly as possible to 600° Fahr., and maintain it there for a stated period, for the purpose of oxidizing it. Control of temperature was all-important, as on the correct timing, and degree of heat, depended the success or otherwise of the process. The same kind of pans were used as for coal; and the Keith and Blackman Company made burners to our requirements in three sections—two outer and one inner—each controlled by a separate tap and injector. These burners are now catalogued in Keith's list. Gas at 2 lbs. pressure was used. This was before the time when compressors were made specially for industrial purposes; so we obtained an "Empire" blower, specially made to my own design with gas-tight bearings and a relief valve. Three pots were at first fitted; and the only trouble about the job was that I got some of the vapour down my throat, and lost my voice for a few days in consequence.

We learnt on this job two essentials for all gas-heated apparatus if economy is to be obtained—first, to strictly limit the space for the products of combustion, and, second, to see that no air is drawn through or over the heating spaces other than that strictly necessary to support combustion. In nearly all forms of the industrial application of gas as the heating medium, radiation plays a very important part; and while with flame-contact a good deal of the heat is transmitted, unless the spaces are restricted, by bringing the brickwork close to the job, full advantage cannot be taken of the radiant heat which is obtainable from the brickwork. With respect to the restriction of the passage of air, we find the best plan is to fit either the inlet or outlet with an adjustable damper, close this until it is quite apparent that the flames are short of air, and then open slightly till the flames burn freely without any muffling or flagging effect. The foregoing job was very encouraging, because, owing to what I considered as unfair electrical competition, the firm had practically ceased to be gas consumers. Their consumption is now well over a million cubic feet per annum.

The same firm own a works in Calcutta, and a similar installation was sent out there for them. One of the employees left to become manager of a rival firm's works in Ireland who also got my advice on fitting up the place. So that the results were fairly far-reaching, although unfortunately Calcutta and Ireland are not within the Newcastle and Gateshead Company's area of supply.

Consumption.

One day we were asked if we had a special price for gas used by engines. Now I do not think any gas salesman has fulfilled his duty if he only answers a simple question like that. I went down to see the people to discover what the engine was for, and anything else I could find out. I found it was for driving mixers in bitumen vats. Now bitumen can only be mixed when hot; so I suggested that perhaps gas might melt as well as mix. After considerable discussion, I provided them with rough sketches, got

their order to provide the necessary compressor, burners, piping, &c.; and the job has gone on satisfactorily to this day with one exception. The old plant—displaced by the one under review—was fired with solid fuel, and about once in six months a new pot was required, owing to the old one cracking or burning through. The real trouble was caused by the lack of control of temperature, with the consequent carbonizing of the pitch on the bottom of the pan forming insulation and preventing the heat getting to the material under treatment. After the new plant had been in use about three years, the firm asked me to go down and advise why the time taken per mixing was considerably in excess of former times. On examination, I found the bottom of the pot at a dull red heat, and asked if it had ever been cleaned. The reply was in the negative; so the cause of the trouble was quite obvious, and was quickly remedied. Because gas apparatus requires little attention, I often find there is a tendency to give it none.

Another time I learnt that a firm who were firing some varnish boiling vats with producer gas, also driving their gas-engines from the same source, were considering how best to augment the supply. Their inclination seemed to run towards using electricity from the town's mains for power, and thus set at liberty producer gas for the vats. I was able to induce them to fit several vats with high-pressure gas-burners, leaving their gas-engines as they were. The experience gained on the two previously mentioned cases enabled me with accurate knowledge to deal with this job. It was really very similar to the foregoing, and does not merit a separate description. But the point is worth making that if we had not carried out the previous jobs, with the knowledge consequently obtained, I would probably not have been in a position to so adequately and satisfactorily deal with this one.

I casually learned one day, while in a local works, that the firm were considering furnaces for heating large yellow metal billets for a process they were about to commence. From all that I could learn, it seemed that gas would be very much better than coal; so I approached the principal, and found my suggestions very sympathetically received. The anticipated operations were most thoroughly discussed, and, as a result, I was able to draw up a list of the features which would be essential in any furnace likely to be successful.

We wrote to two furnace makers identical letters setting forth the requirements. I must frankly say I could not see my way through all the difficulties, and was anxious to obtain other peoples' help. One firm quoted for one of their standard furnaces, which, although it might have accomplished the work, could only have done so with a great amount of labour. The other firm submitted a quite new and original design, which we put forward to our friends; and the order was ultimately placed with them. The furnace proved very satisfactory, and has since been triplicated. It is very satisfactory to know that during the present war these furnaces have contributed in no small degree to meeting successfully the enormous demands that have been made by the Ministry of Munitions for more and more material, and they are worked night and day almost without cessation. The gas consumed by them is at the rate of over 7,000,000 cubic feet per annum.

Special Types of Plant.

Now we come to an altogether different type of job. A local firm, seeing that the importation of chamois leather gloves was largely stopped, commenced to manufacture them on quite a considerable scale. At one point in the treatment of the skins it is necessary for them to be dried, and, as it was impossible to dry them in a reasonable time by natural means, they asked us if it could be done with gas. Of course it could; and so we recommended them to build a chamber of suitable size and simply put three rows of burners in the bottom after the manner of a japanning oven, with the exception that, in order to protect the skins from direct heat or the possibility of burning one if it fell, sheet iron protectors or distributors were placed over the burners. As the temperature necessary was only a low one, the whole place was built of wood. It has been at work now several months, and is quite satisfactory. If any elaborate arrangement had been recommended, the cost alone would have prevented business.

The war has caused many alterations and additions to factories. A very important job we have carried out was the fitting-up of fifteen white metal melting pots, each pot holding 30 cwt. of metal. The process for which the metal is used is best carried out by limiting the temperature within narrow margin above the melting point—firstly, because there is less oxide formed, and, secondly, as the metal is required to cool as quickly as possible after casting, time is saved by having it only just hot enough.

First I was asked by the firm as to the possibility of using gas for the purpose. After working the matter out and quoting them an estimated cost per hour, they gave us the order to proceed with twelve pots. After looking up the makers' lists in vain for a suitable burner, and after negotiations failed to get promise of quick enough delivery of special ones, we placed the order for the necessary burners with a local foundry. The difficulty was this. Standard high-power burners are only made with one length of bunsen tube; and for convenience in working and cheapness in installation, we desired to use three burners placed in the form of a triangle, and with the adjusters for the bunsens fitted outside the furnace and in line. If standard burners had been used, the adjustment would have been some distance inside the furnace—a very awkward matter for the attendant, on account of the difficulty of reaching and seeing at the same time; and again, because of the heated state of the air so near the burners, the conditions would have been somewhat unstable.

This brings me to another point. Some time ago I got hold of a list of bunsens, &c., made by an American firm, which gave, among other information, the gas consumption of each burner listed, and also the size of flame, with advice as to the distance the burner should be fitted from the vessel to be heated. I have looked in vain for any similar information in a British maker's list. So far as I can gather, one firm does give some indication of the consumption of some of its burners; but as they are all calculated at 1-inch pressure, with gas of a high calorific value, they are not much good.

In the job just under review, before giving a rough sketch of the brickwork required, we took the precaution of testing and adjusting the gas consumption, also of measuring the flame. Everything was not exactly right with the first pot at the commencement; but we were very fortunate in finding that the builder's foreman took a great interest in the job, and all was soon put right. The difficulties were small, and consisted chiefly of obtaining the exact relationship of the pan to the brickwork to ensure the correct travel of the exhaust gases. This job is an extremely good and important one, giving great satisfaction. I regret that I am unable to give further details, as the firm who have it have specially requested that no illustrations, &c., be published.

There is one field for the use of gas that is, I think, entirely novel, and that is in the skin and partial drying of moulds in the iron and brass foundry. One firm in our area cast, as a stock job, a large number of spur-wheels; and while it is not necessary to thoroughly dry the whole, a much better job is made by evaporating the moisture from the inside surfaces. They had been accustomed to carry out the necessary drying by means of a coke-fire; the coke being allowed to get red in a shallow fire-box, and then placed over the mould. This did the work; but the labour was excessive, both on account of making and handling the fire, and of cleaning the mould of some ash after the drying was completed. I recommended an arrangement similar to the grilling fret on a gas-cooker. They made this for themselves, and it has answered perfectly.

The firm also had a very awkward job. They had an order for a lot of pump cylinders of a type in which the bulk of the metal was in one place; and although it was thought possible to cast in greensand, on trial practically every casting was a failure. Our aid was sought, and we rigged up a bunsen burner, to be left burning inside the mould all night, so arranged that the heat was directed to the part of the mould where the bulk of the metal would be; and the job was a complete success. Other casting jobs were treated somewhat in the same way. For another firm, who wanted the surface of practically all their moulds skin-dried, and who I observed were using oil-blow lamps, we rigged up some special blow-pipes for use with air at 80 lbs. pressure. To have used all the air necessary for combustion from the 80 lbs. supply that was available by reducing at a valve or tap would have been very extravagant, so a burner of the injector type was used—the high-presure air through about a 1-16th hole being used to inject both the gas and the further supply of air necessary for combustion. Girls just pass the flame over and over the surface of the sand till the moisture is evaporated for about half-an-inch down. The first six or seven of these blow-pipes were purchased from gas apparatus manufacturers. I adjusted the first one, and they did the rest. A little time since, however, the founders desired to accelerate the work, and ordered a larger sized blow-pipe to try. We could not buy one of the kind required, so designed one to be made from malleable pipe fittings and ordinary wrought-iron pipe of the required sizes. We got this made locally, and adjusted so as to give a very short bulbous flame; and after trial the firm ordered more to replace all the former ones. I may state here that the direct-flame method of skin-drying is only of value where no coal dust is mixed with the sand, as in this case the flame ignites the particles of coal and makes the surface too rough.

There is another considerable use for gas in the foundry, and that is for core-drying ovens for drying the smaller cores. The very large ones are best dealt with in the large brick chambers, either coke or producer gas fired. In nearly all foundries there is a considerable saving in labour and time to be made by installing a gas-heated core-drying oven for small work. I have been the means of getting two or three into use with considerable satisfaction. They are really like a large gas-oven. One we had constructed for special work was designed after the style of a Mabboths bakers' oven, with drop-down doors of varying sizes, so that each compartment could be used for work up to given dimensions—thus considerably increasing the capacity of the drying. It is no use having a shelf with 2 feet of space above it for (say) a 3-inch core—something smaller, just allowing for working, is preferable. The oven was made of wrought iron jacketed; but I think there is distinctly an opening for one or more of the makers to produce and list similar ovens made in cast iron, which for nearly all purposes where there is heat of considerable intensity is much preferable. Another advantage of the gas-fired core-drying oven is that there is no difficulty in opening the oven and putting in or removing work at any time. Where coke is used, the fumes are, of course, very unpleasant. I may state that at least three local foundries now use this type of oven.

I could continue multiplying the cases for which gas is used; but what I have endeavoured to show is how a few of the special cases cropping up in the life of a gas salesman have been quite satisfactorily dealt with. Many of these jobs which when looked

back upon appear quite simple required a considerable amount of consideration and supervision, and emphasize the paramount necessity of every gas salesman studying the working conditions of his customers, and gradually building-up a fund of information regarding general workshop practice which can be called up for use as occasion demands. To this must be added an inventive capacity, which is perhaps engendered by studied observations as just stated, and, further still, the spirit of service—the desire to please and to live one's business, instead of just spending so many hours at work.

Quality of Available Plant.

Before closing, I must add that so far I have only treated with that side of a gas salesman's life as touching industrial heating uses for gas. I do not propose to say anything regarding the domestic or lighting side, except to make one or two remarks upon gas apparatus generally, which I hope will not be considered out of place. As chief of the Sales of Gas Department of the Company I have the honour to serve, the character of the apparatus provided by the various manufacturers, and which a gas undertaking either sells or hires, has often perplexed me, and caused me to wonder whether all is as it should be. For instance, up to a comparatively recent period we sold almost any lighting burner that was popular, and should probably have condemned anything not fitted with a good gas and air regulator, as is usual. On giving special consideration to the question of adopting a standard burner, after many trials and some tribulation, we adopted one with fixed gas and air adjustment; and in spite of prophecies of failure, we have found it the only reliable burner we have tried, and that the maintenance is fractional compared with any other burner with which we have had experience. This leads me to remark that the present is a very opportune time for the gas supplier and gas apparatus manufacturer to work in conjunction—the former by providing information as to the specific gravity and thermal value of his gas, and the latter by abolishing adjustments, and providing a range of suitable nipples, so that he may supply the correct one for the districts concerned.

From actual personal observations, I am convinced that a lot of gas apparatus does not give the satisfaction that it should do, because of incorrect adjustment; whereas I am sure that, with the nipples of the correct size, no other adjustment is at any time necessary to prevent either firing-back or to stiffen the flames. All that is required is to operate the control tap—a much easier operation than either a gas or air adjustment. I intend these remarks to apply to practically all gas apparatus.

I recently bought for use at my house a new gas-cooker, fitted with both gas and air adjusters. On fixing and trying it, I found it practically impossible to get good stiff hot flames. I therefore abolished the adjustments, hammered-up and rebroached the nipples, filed away part of the bunsen tubes so as to increase the air supply, and got the type of flame desired.

I know that, in my advocacy of the abolition of what is often considered an essential feature of any form of gas-burner, I may be considered heretical; and I admit, without the co-operation previously mentioned, the allegation may be true. But, granted the co-operation, I am absolutely convinced that gas apparatus with fixed nipples, made to suit the gas on which they are to be used, would result in much greater satisfaction to the users. And this, after all, is the important point. I do not wish it to be understood for a moment that each gas authority should have nipples specially made for them, as by tabulating the qualities of the various gases, it would be found that the range of nipples required would be small. The adjustment of no nipple for ordinary commercial use needs to be microscopical, and the range of variations over which a given size nipple will work with perfect satisfaction is a considerable one.

DISCUSSION.

The Acting President (Mr. William Hardie) said Mr. Roxburgh had shown them how necessary it was that a man should be capable of going into the various details of the kind of work which gas supply authorities had to do at the present time.

Mr. Norman S. Cox (Sunderland) said the paper was, from his point of view, not so much a paper for discussion as one of real personal experience. He thought it was a question of great importance so far as furnaces were concerned to have a demonstration room where people could see results for themselves.

Mr. F. P. Tarrett (Darlington) said he would like Mr. Roxburgh's experience of high-pressure gas; and the efficiency of it, and otherwise. His experience was that gas supplied under pressure was very satisfactory. As to the question of burner nipples, he thought where the pressure was high the fixed nipple might be satisfactory; but where there was a low or varying pressure, the adjustable nipple was almost necessary. He would like to ask Mr. Roxburgh if he was of opinion that the melting of copper and brass had up to now been brought to a financial success.

Mr. T. Hardie (Newcastle) said, with regard to the standard burner, they in Newcastle did not lay any special claim to supplying gas of only one quality, but the adoption of a standard burner had certainly been justified by the results.

Mr. Willis endorsed all Mr. Roxburgh had said with regard to fixed nipples and the use of a standard burner.

Mr. Roxburgh, in replying to the remarks made, and referring to the question by Mr. Tarrett respecting high-pressure gas *versus* low-pressure gas and air for furnaces, said it all depended. For purposes where the gas-flame was not in confined spaces, he thought they could get any result they liked from high-pressure gas; and probably they did not want to go higher than 2 lbs. to 3 lbs. pressure. But the secret of all high-temperature furnaces was the limitation of combustion areas; and where they had their combustion area very limited, they could get much better results from high-pressure air. They must remember they had to compress five times as much air as they had gas. Where high temperature was required, he always recommended high-pressure air and low-pressure gas. With regard to the melting of copper and brass, the whole system was in the "melting pot;" and the present systems would have to be considerably modified before gas was completely successful. As to the question of fixed nipples, he believed the whole thing was the size of the nipple as compared with the specific gravity of the gas, and that the calorific value of the gas had not much to do with it. Then as to the fallacy of the adjustable nipple, the gas as supplied varied not at regular intervals but from 2 to 6 inches daily; and nobody got up to adjust a burner on every change of pressure in the pipe. The great thing wanted was the correct size of the nipple for the specific gravity of the gas where it was being used. The variations in the specific gravities of gas throughout the United Kingdom was not great; and probably half-a-dozen different sizes of nipples for every size of apparatus would cure the whole thing, and cost less money than the contraptions put on at present.

HEAT TREATMENT OF BRASS IN NEUTRAL AND REDUCING ATMOSPHERES.

THE USE OF COAL GAS.

By Alfred H. White and Bert A. Standerline.

[A Paper presented to the Detroit Meeting of the Michigan Gas Association.]

When copper and zinc are melted together to form brass, and when brass billets or other articles are heated in annealing furnaces, there is a material loss of metal. This loss is due in part to volatilization of the metal which is evolved as metallic vapour, and is usually changed to oxide that passes away with the fume, and is in part due to direct oxidation of the solid metal to form a scale which remains on the metal. The volatilization of the metal is theoretically independent of the composition of the gases surrounding it; and if the reaction takes place in a closed vessel, and if sufficient time is allowed to attain equilibrium, is dependent only on the volume of the gases, the composition of the alloy, and the temperature to which it is exposed. The relation of the temperature and the composition of the brass to the volatilization has been studied by Thorneycroft and Turner,* and is not discussed in this paper.

The volume of the gases surrounding the metal affects the volatilization materially, for the amount of metallic vapour which a gas may hold is constant for a given temperature and pressure; and therefore in practice the greater the volume of gas and the more rapidly it is circulated over the metal, the greater will be the volatilization in a given time. Theoretically, the composition of the gas does not affect the volatilization of the metal; but this does not hold in practice, for the metallic vapours become converted to oxides in an oxidizing atmosphere, and equilibrium being thus destroyed, further amounts of metal volatilize. This is the case in the ordinary heat treatment of brass, since both zinc and copper are readily changed to the oxides.

Copper-zinc alloys will suffer least loss in heat treatment at a given temperature if they are heated for as short a time in as small a volume of neutral gas as is possible. The small volume of gas may be attained if the metal is placed in a covered crucible, as is done in the melting of brass or by the use of an externally fired muffle furnace. When, however, the door of the muffle must be opened frequently, and the air-space in the muffle is large, the circulation of the air within the muffle nullifies its advantage. An externally-fired muffle also involves low fuel efficiency and a longer time to bring the metal to the desired temperature. There is, too, uneven heating in a muffle furnace; the material near the hot walls being necessarily heated more rapidly than in the centre.

In a paper presented before the Association last year,† as one of the results of your co-operation with the University of Michigan, it was shown that it was possible to heat iron or steel to a temperature of 2200° Fahr. for an hour without more than traces of oxidation, by exposing them directly to the gases formed by the combination of 1 volume of coal gas with about 2 volumes of air. The furnace used was a muffle heated both internally and externally. A mixture of gas with 2 volumes of air burned at the entrance to the muffle, and the products of incomplete combustion passed through the muffle over the metal and out at the farther end, where they mixed with more air, burned completely, and passed back round the muffle. The theoretical temperature to be obtained from the combustion of 1 volume of coal gas and 2 volumes of air is 2250° Fahr.; and aided by the secondary combustion outside the muffle, an actual temperature of 2200° Fahr. could readily be maintained within the muffle.

In these circumstances, about 27 per cent. of the available

* See "Journal of the Institute of Metals," Vol. XII. (1914), p. 214.

† "Heat Treatment of Iron and Steel in a Neutral Atmosphere." By A. H. White and Homer T. Hood. See "Journal," Vol. CXXXII., p. 138.

SUMMARY OF TESTS *on Copper and Brass Heated for One Hour in an Atmosphere Formed by the Incomplete Combustion of Coal Gas and Air.*

Number of Sample.	Temperature. Max. °Fahr.	Temperature. Min. °Fahr.	Ratio Air. Gas.	Area Test Piece. Sq. In.	Initial Weight. Grammes.	Change in Weight. Loss. Grammes.	Change in Weight. Gain. Grammes.	Appearance after Test.
				A.—Commercial Copper.				
5	1162	932	2·93	8·32	1·5370		0·0007	Dark in spots
15	1139	1087	3·10	8·72	1·8089		0·0006	Bright
16	1177	1123	3·00	8·50	2·1628		0·0013	Very slightly dull
				B.—Brass with 90 per Cent. Copper and 10 per Cent. Zinc.				
22	1060	1009	2·93	4·50	0·9032		0·0008	Dull copper colour
23	1087	1038	2·86	5·00	1·0078		0·0006	Dull copper colour
24	1526	1501	2·55	4·81	1·0778	0·0475		Dull copper colour. Carbon deposited
25	1504	1474	2·55	5·00	1·3067	0·0388		Dull copper colour. Carbon deposited
26	1224	1206	3·21	4·71	1·0270		0·0001	Grey
27	1242	1215	3·18	5·39	1·2375	0·0000	0·0000	Oxidized
				C—Brass with 70 per Cent. Copper and 30 per Cent. Zinc.				
1	1197	1024	3 81	10·00	3·1569		0·0025	Grey
3	1798	1724	1·33	11·52	3·5680	0·8370		Carbon dep'd. Partially fused. Copper colour
4	1582	1461	1·93	9·96	3·3296	0·1142		Partly grey, partly copper colour
6	1629	1508	2·33	7·38	2·5188	0·1273		Fairly bright copper colour
8	1114	1067	3·10	8·50	2 8698		0·0015	Grey
9	1130	1062	3·19	6·84	2·3095		0·0007	Greyish brass colour
10	1526	1468	2·23	7·00	2·2048	0·2900		Carbon deposited. Copper colour
11	1656	1603	2·23	7·86	2·1200	0·3377		Dull copper colour
12	1405	1249	3·02	7·38	2·3231	0·0215		Greyish brass colour
13	1220	1189	2·91	8·11	2·2870	0·0003		Greyish brass colour
14	1141	1114	3·33	7·50	2·2216	0·0022		Greyish brass colour
18	1209	1188	3·81	6·09	2·2632	0·0004		Dull yellow brass colour
19	1215	1186	3·27	6·20	2·3222	0·0007		Greyish brass colour
20	1233	1143	3·28	6·00	2·1260		0·0001	Light grey brass colour
21	1162	1137	3·27	5·86	2·1200	0·0018		Light grey brass colour

heat was liberated in the primary combustion within the muffle, and the remainder in the secondary combustion around the muffle. Of the products of combustion, steam and carbon dioxide, as well as any excess of oxygen, act as oxidizing agents; while hydrogen, carbon monoxide, and any hydrocarbons act as reducing agents. With 2 volumes of air to 1 volume of unenriched coal gas, the reducing agents have approximately 1·75 the volume of the oxidizing agent; while with 2·4 volumes of air to 1 volume of gas, the reducing agents are still one-and-a-half times as great as those which are oxidixing.

A gas of this neutral composition may be obtained from the partial combustion of natural gas, petroleum, coal gas, or carburetted water gas. Producer gas as it comes directly from the producer may have also approximately this composition, although especial care would have to be given to the operation of the producer to obtain it, and it would be of variable composition. It would have to be used hot as it came from the producer; and only its sensible heat would be available for heating the material within the muffle, since, if air was introduced for partial combustion, it would raise the proportion of oxidizing gases. Walker* has shown that it is practicable to use producer gas in annealing sterling silver which contains 92·5 per cent. of silver and 7·5 per cent. of copper.

EXPERIMENTAL METHOD.

The general method was the same as that used formerly for the study of the heat treatment of steel. The furnace was a vertical muffle furnace, consisting of a quartz tube with a Meker burner luted into the lower end. Both the gas and air entering this burner were metered; and as the mixture of air and gas rose within the tube, and became heated, it ignited, so that the test-piece hanging in the upper part of the muffle was surrounded only by the combustion gases. These gases of incomplete combustion passed out of openings in the cap of the quartz tube into an annular space, where they met secondary air sufficient for complete conbustion, and then passed down around the quartz tube and out of the furnace. [A sketch of this furnace was given in the previous paper.]

The heat treatment of brass does not involve such high temperature as the treatment of steel; but the volatilization of the zinc and the readier oxidation of both zinc and copper complicate the situation. An unexpected complication in furnace construction was also introduced by this lower temperature, for a mixture of coal gas with even 3 volumes of air does not burn unless preheated. With the higher muffle temperature used in the work on steel, the gases were satisfactorily preheated as they progressed into the muffle. In the work with brass, it was necessary to put in a chequer-work of refractory material over the gas-inlet. This chequer-work became hot during the preliminary heating of the muffle, with full oxidizing flame, and maintained its heat during the subsequent operation with the reducing flame.

The experiments were conducted entirely on the laboratory scale and on three tests of materials—commercially pure copper, brass with 90 per cent. of copper and 10 per cent. of zinc, and brass with 70 per cent. of copper and 30 per cent. of zinc. In ordinary commercial operations, both the volatilization and the oxidation are dependent on the amount of surface of the piece rather than its weight. The material used in these tests was therefore always rolled into thin foil to give more surface; and in order to get this into a compact volume, it was rolled into a loose spiral, which was hung in the furnace with its axis parallel to the travel of the gases. This spiral was introduced into the preheated furnace, and allowed to remain for one hour. Special care was necessary in removing it from the furnace, since the oxidation during the few moments required for cooling in the air would have been much greater than that involved in the furnace treatment of an hour. The spiral was chilled before removal from the furnace by lowering a short cast-iron tube into the furnace and raising it so that the spiral dropped inside. The relatively heavy mass of the cold iron chilled the thin spiral, so that it could be withdrawn without oxidation.

The changes in the foil due to the heating were determined by the change in weight and the visual appearance. Since the thickness of the foil was usually less than 0·008 inch, superficial alteration would have been delicately shown by the change in weight had it not been for the compensating action of the different changes. Volatilization of metal decreases its weight, while oxidation increases it. It is possible, therefore, to have a loss due to volatilization exactly compensated by an increase due to oxidation. The appearance of the surface indicates, however, when there has been material oxidation.

The gas used was in every case an unenriched coal gas of 600 to 615 B.Th.U. per cubic foot. The composition of the products of incomplete combustion, their temperature, and the thermal efficiency of the process were discussed in the former paper.

EFFECT OF HEATING COPPER AND BRASS IN A NEUTRAL ATMOSPHERE.

Commercial copper foil, when heated in the gases formed by burning 1 volume of coal gas with 3 volumes of air, does not suffer appreciable oxidation in an hour at a temperature as high as 1178° Fahr. The change in weight under these conditions is negligible; and the bright surface of the copper is scarcely tarnished. Details of the test are given in the table. The behaviour of copper at 1500° Fahr. is indicated by Tests 24 and 25 of the alloy with 90 per cent. copper and 10 per cent. zinc, where, with 2·5 volumes of air to 1 of gas, the zinc was volatilized from the surface, which was left a dull unoxidized copper colour. A similar phenomenon was shown with the alloy having 70 per cent. copper and 30 per cent. zinc at high temperatures up to 1798° Fahr., as shown in Tests 3, 4, 6, 10, and 11. It is concluded that copper can be heated in this way to any temperature up to nearly its melting point without material scale formation.

The behaviour of brass with 90 per cent. of copper and 10 per cent. of zinc is shown in Tests 22 to 27. At 1060° and 1087° Fahr. there was little effect due to an hour's heating in a mixture of 2·9 air to 1 of gas; the colour being almost unchanged and the loss in weight trifling. At 1224° and 1242°, with slightly more oxidizing conditions (3·2 volumes of air), the surface became grey and oxidized; but the weight was unchanged—the increase of weight due to formation of oxide being evidently compensated by the volatilization of the zinc. At 1500° to 1526° Fahr., with a still more strongly reducing atmosphere (2·55 volumes of air), the metal became somewhat coated with lamp-black; but when this was brushed off, it was found that the surface was oxidized, but had assumed a dull copper colour due to volatilization of zinc from the surface. If the entire loss of weight can be laid to zinc, it indicates that about 40 per cent. of the zinc was volatilized. This is apparently a large loss; but when it is considered that the foil

* See "Journal of the American Chemical Society" for 1907.

was only 0·008 inch thick, it is seen that this amount of zinc could have come from a surface layer only 0·0016 inch thick.

The brass with 70 per cent. of copper and 30 per cent. of zinc was given more attention than the others. This brass tarnished much more readily than the others; and it was difficult under any conditions to prevent it from showing a grey surface. At temperatures below 1250° Fahr. (Tests 1, 8, 9, 13, 14, 18, 19, 20, 21) with from 2·9 to 3·8 volumes of air to 1 of gas, the change in weight was negligible. It was sometimes a gain and sometimes a loss. At 1045° Fahr. (Test 12), with 3·02 volumes of air, the loss in weight was about 0·9 per cent. of the total weight, or 2·7 per cent. of the total zinc. At higher temperatures, even with stronger reducing conditions, the loss in weight was greater.

In Test 6, with 2·33 volumes of air to 1 of gas and a maximum temperature of 1628° Fahr., the surface was a fairly bright copper colour, showing that almost all the zinc near the surface had been volatilized. The loss in weight was about 5 per cent. of the total weight of the brass, corresponding to 15 per cent, of the weight of the zinc.

At 1655°, as shown in Test 11, the result was similar, with a loss in weight of 16 per cent.. corresponding to a removal of zinc from a layer only 0·002 inch thick. The melting-point of this brass is about 1760° Fahr.; and in Test 3 this temperature was approached at the beginning of the test (1724°), and surpassed at the end of it (1798°). The brass heated for an hour under these conditions in a strongly reducing atmosphere made by combining 1 volume of coal gas with 1·33 volumes of air, became coated with carbon; but on brushing this off the metal was a dull copper colour, showing occasional holes and fused globules of bright copper. The loss in weight was 23·4 per cent., corresponding to 78 per cent. of the total zinc, or the amount of zinc coming from a layer 0·003 inch thick. It is thus shown that brass can be heated, even up to its melting-point, for an hour in a stream of neutral gas with only trifling surface changes.

SUMMARY.

The method described a year ago for heating iron and steel in a neutral atmosphere has proved itself advantageous also for brass and copper. Copper is not oxidized when exposed directly to the products obtained from burning coal gas with an insufficient amount of air; the proportions of gas and air varying with the temperature to be reached. Up to 1200° Fahr., 3 volumes of air to 1 of gas may be used, and still smaller proportions of air must be employed for higher temperatures. The volatilization of the zinc from brass is primarily a function of the temperature, but can be reduced to a minimum by rapid heating and a neutral atmosphere which limits the loss to that due to temperature and largely eliminates that due to oxidation.

This rapid heating in a neutral atmosphere can be readily obtained in a muffle within which coal gas is burned with an insufficient supply of air, and around which these products of combustion are burned with additional air. The pieces placed within the muffle are thus rapidly and evenly heated with a minimum loss of weight due to the volatilzation of the zinc. The loss of zinc after brass with 70 per cent. copper and 30 per cent. zinc was heated to almost its melting-point for an hour, amounted to an elimination of zinc from a layer only 0·003 inch thick. With lower temperature, more favourable results were obtained.

The actual commercial value of this process can only be determined after tests on a large scale. There is every reason to believe that, with proper design of furnace, it will be quite successful.

GAS JAPANNING OVENS.

By ALFRED H. WHITE and JOHN T. NAYLON.

[Abstract of a Paper read before the Michigan Gas Association.]

In dealing with the subject of the influence of gases within the oven on baking japans, the authors described the modern practice of japanning, and the reactions in the ovens. As to the ovens themselves, they remarked that the operation of the japanning oven has much to do with the excellence of the finished product; and there has been much discussion as to the proper type of oven. One of the first baking-ovens put on the market was heated by coal or coke.

The introduction of gas as a heating agent in japanning ovens marked a distinct advance. The temperature could be readily regulated, and the combustion made so perfect that the gas could be burned in the same compartment with the japanned pieces. Thermal efficiency was increased in this manner; and it was further aided through greater care in the design and insulation of the oven.

The open gas-fired oven can be classified into the up-draught and the return or down-draught. In the up-draught oven, the stack gases pass directly from the top of the oven; while in the down-draught type they are recirculated downward and drawn from the bottom of the oven. The latter type shows a decided gain in thermal efficiency and in evenness of temperature. Cases have been known where the difference in temperature between the top and bottom of an up-draught oven has been as much as 40° or 50°; while in the down-draught oven this has been cut to as low a figure as 2° to 5°. It is evident that an even heat distribution in the oven is desirable, and will enhance the uniformity of the product.

The burners used in these ovens are of three kinds—*i.e.*, atmospheric, blast with mixer, the induction type. The atmospheric burner, as the name indicates, is one which burns with no induced or forced air. There is some danger of "smothering" with these burners, where the draught is poor. If the burner goes out, the gas keeps passing into the oven and, mixing with the petroleum thinner vapour and air present, may explode spontaneously or catch fire from the other burner or when a match is lighted to start the smothered burner.

The blast-burner with mixer was the next step after the atmospheric burner. The marked advantage of this oven over the older atmospheric type is the more perfect combustion and entire freedom from smothering. A constant supply of air for combustion is always present; and no matter how heavy the vapours may be that surround the burner, it is impossible to smother it. A unique and also useful valve has been put on the market whereby the possibility of fire has been greatly decreased. With this valve, the gas is automatically shut-off if the air is cut-off, due to trouble with the blower. It can only be started again by opening the valve by hand. The disadvantage of this type is the higher initial cost of installation and maintenance.

The induction burner is the latest type, and is based upon the same principle as the bunsen. The gas is boosted in pressure by a gas-booster, and shot through a small orifice at a pressure of about 1 lb. to the square inch. The mixing of air and gas takes place in the burner, and is controlled by changing the pressure of the gas. This has the advantage of doing away with the complicated and expensive mixer; and since the volume of gas is only one-fifth that of the air, the cost of the gas-booster is small. This type has the advantages of the blast-burner, but has not the disadvantage of costly installation.

In the muffle type of oven, the gas-burners are in a separate chamber from the material being baked. While the outer casing of the oven may be the same as in the previous cases, the muffle is introduced to prevent the gases of combustion from coming in contact with the japanned parts. The muffle itself is a shell of thin sheet metal, within which the material is baked, and around which the hot gases circulate. Within the last few years electricity has been pushed as a competitor of gas for heating japanning ovens; the heat coming from coils of a high-resistance wire installed within the oven. Electricity is an expensive sort of heat; but justification for its use has been claimed on the ground of freedom from fire risk, ease of control, and superiority of product. It is evident that any desired temperature may be reached with any of the types of ovens, and that probably fairly even oven temperatures can be obtained with proper design. The great comparison of the types is between the direct-fired gas-oven and the muffle or electrically heated oven, where the goods are not in contact with the gases of combustion.

The gaseous products of complete or incomplete combustion of gas from a city supply—such as carbon dioxide, water vapour, carbon monoxide, hydrogen, and hydrocarbons—cannot exert any harmful action in the japanning oven, so long as they remain in the gaseous or vapour form. It is therefore immaterial from this standpoint whether japanned goods are exposed directly to the products of combustion or are heated in a gas-fired muffle or in an electrically heated oven.

The condensation of liquid water within the muffle should be avoided, as liable to spot the goods. The gases arising from the combustion of coal gas with the theoretical amount of air will be saturated for water vapour at about 150° Fahr.; and if double the theoretical amount of air is used, they will be saturated at about 125° Fahr. Thus if the temperature at any point in the oven drops below this, there will be danger of spots. If the oven is warm when the goods are introduced, the danger from this source should be slight, even in a direct-fired gas-oven, and is, of course, entirely absent in a muffle or electrically heated oven.

Dust or solid particles of any type are objectionable, whether introduced with the air or deposited within the oven. Soot may be formed through defective combustion of gas used as a heating agent; but with modern burners and proper draught there should not be trouble from this source.

The petroleum thinner of the japan oxidizes if air is present in the japanning oven, and forms tarry or carbonaceous particles which deposit locally and cause defects on the finished goods. If no air is present, the vapours of the thinner may be heated for three hours to 500° Fahr. without more than minute carbonaceous deposits appearing; while with forty volumes of air to one of petroleum vapour, an exposure of one minute to a lower temperature is sufficient to cause large and dense deposits.

It is evident that, since this formation of carbonaceous deposits is due to air within the oven, it may occur in the electrically heated or the muffle oven as well as that fired directly with gas. In fact, the direct gas-fired oven should have an advantage on this score, since the inert carbon dioxide and water vapour will sweep out the petroleum vapours without oxidation. It is believed that this phenomenon, previously overlooked, is the cause of a material proportion of the defects in japanned goods. The remedy lies in proper regulation of the air supply to the oven during the japanning process.

The Quarterly Index.—As has already been intimated, copies of the Quarterly Index to the "JOURNAL" are now supplied to subscribers only on application. Those whose names are already on the list are having sent to them the index for the volume July to September; and a copy will be forwarded to others who may intimate their wish to be included in the list.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The So-Called National Gas Council.

SIR,—As one who joined the gas engineering profession twenty-five years or more ago, and as a member of the Institution of Gas Engineers, I wish warmly to support the attitude taken up in last week's "Editorial Notes" on the "The National Gas Council"—to which title I have prefixed the description "so-called." For it is clear as noonday, that so long as the Society of British Gas Industries is excluded from taking a full and equally responsible share in the executive of the Council, not only is a grave injustice done to a vital and representative part of the gas industry, but there is a mere semblance, and not any reality, of a truly "National" Council.

And what is the explanation given for such an obviously unfair, partial, and biassed proceeding? Apparently, those who have, more or less in a hole-and-corner way, engineered this provisional procedure either have no explanation to offer, or are ashamed to set out any reasons for all to see. Vague references are made—in rather curious phrase—to a supposed desire that "the National Gas Council wanted to be formed upon more conservative lines in the first instance." What on earth does this mean? Then, it is said, "there were obvious reasons why they [the Society of British Gas Industries] should not be on the Executive Committee." I may be very dull witted; but for the life of me, the "obvious" reasons do not show themselves to my poor vision.

And yet perhaps there is a slight glimmer of light that breaks through, and that possibly illuminates the emigma; for I read that the participators had been brought together "by two men specially," of whom one was Mr. Harry Jones. Need more be said? The same "JOURNAL" announces that a lecture on "The Gas Engineer of the Last Century" is to be delivered by Mr. Harry E. Jones. I am sure all will agree that no one else in the whole of the gas profession and trade could be found more eminently qualified, or whose long years of past experience more entitle him to be heard on such a subject as the gas engineer of the last century than Mr. Harry E. Jones.

But we live in the Twentieth Century; and the present times of world-wide upheaval call for different views and methods, and for the organization of industry on firm and wide-reaching lines, so as to attain the highest efficiency and to meet the severest competition.

Oct. 13, 1916. MEMBER, INSTITUTION OF GAS ENGINEERS.

Gas (Standard of Calorific Power) Act, 1916.

SIR,—I have been approached by several authorities with respect to applications to the Board of Trade under the above Act; and from what has been placed before me, both by those making applications and those considering opposition to applications, it would seem that there exists much confusion as to the best course to be adopted in the interests of gas undertakers and local authorities relative to the apparatus for, and the method of, testing the calorific power of gas.

I need hardly say that the matter is one of considerable importance to readers of the "JOURNAL;" and I therefore venture to place before them what appears to me to be the real situation, and what is the solution of it.

Previous to the Act of the Gas Light and Coke Company in 1914, there were various provisions as to testing calorific power and as to what calorific power meant. In some cases, it was calories net; in some cases, it was calories gross; and so on. It may be said, however, that the Act of the Gas Light and Coke Company stereotypes and defines what is meant by "calorific power;" for it says that calorific power means total heat value in British thermal units; and it specifically says: "The apparatus shall be the most suitable for ascertaining, and shall be used in such a manner and under such conditions as to ascertain, after any necessary calculations have been made, the total heat value of the gas." It will be found that every subsequent Act incorporates these provisions, either expressly or by inference.

Although I am wishful to direct attention, not to Acts which have been passed, but to the position of those now making application under the General Calorific Power Act, yet, in order to make the position clear, I must just briefly show how the universal prescription of "total heat value" quoted above has been dealt with in practice. It was comparatively simple to put it into operation in London, because the Metropolitan Gas Referees exist for the purpose of prescribing the method of testing London gas; and they made a prescription both with respect to apparatus and method of testing for calorific power. As to the Acts outside London, some of them provide that the *apparatus* is to be similar to that prescribed by the Metropolitan Referees; others provide that both *apparatus* and *method of testing* are to be similar to London practice; while other Acts provide that the apparatus is to be agreed upon between the gas companies and the local authorities, with suitable provisions in the event of disagreement. Be it remembered that in every Act in which the testing provisions follow London, one must refer back to the clause I have already quoted from the Gas Light and Coke Company's Act, which deals both with the *apparatus* to be agreed and the *method* of making tests.

As to apparatus, suppose it could be demonstrated now or hereafter that the apparatus prescribed by the Referees was not "the most suitable for ascertaining the total heat value," the position of a provincial gas company compelled to follow the Referees' instructions would be, to say the least of it, unfortunate. As to method of testing, suppose it could be demonstrated—and, as a matter of fact, it is notorious—that the method of testing prescribed by the Referees is tedious and difficult, and not suitable either to a small provincial company or to a local authority employing a gas examiner to make occasional tests, the position of the companies is similarly unfortunate. I think it will be agreed that such a position would be unsatisfactory to company, consumer, and local authority.

Now, as I have already said, I am not concerned with the position of companies or authorities having calorific provisions in their Acts; but I want, if I can, through your columns, to help those who are making applications under the General Calorific Power Act. The suggestion I make is that gas companies in making application should apply for (and local authorities attending such applications should acquiesce in) the use of a calorimeter and a method of testing "to be agreed upon between the company and the local authority, and failing agreement to be similar to that prescribed by the Metropolitan Gas Referees." It would thus be open to them to use any instrument and any method they like, always providing that they are "the most suitable for ascertaining the total heat value of the gas," &c. I have already pointed out that there are several precedents for this arrangement; and under it, it has been possible to use a form of testing in which the operation is both simple and direct, and, moreover, ensures that the result of the test shall be the total or maximum heat value of the gas.

To put it in a nutshell, it comes to this—that if my suggestion is adopted, it gives companies and local authorities a free hand to take advantage of any improvements there may be, and, in fact, to literally comply with the requirements "that the apparatus and method of testing is to be the most suitable;" whereas if my suggestion is not adopted, both companies and local authorities are deprived of all power or initiative, and are tied hand and foot by whatever the Metropolitan Gas Referees may prescribe.

I do not wish to attempt to draw any parallels between the suggestion I make and the existing prescription as to testing for illuminating power; but I should like to point out, with respect to the testing burner, that this is to be the one that gives the best result, and, moreover, is subject to change if either the company or local authority can satisfy the authorities that there is a burner which is more suitable for the testing. This is the position I think gas companies should be in with respect to calorific power; and the adoption of my suggestion seems to me to ensure it.

JOHN F. SIMMANCE.

1, *Westminster Palace Gardens, S.W.*,
Oct. 12, 1916.

Gas Employees and the National Insurance Act.

SIR,—I agree with much that Mr. Livesey writes in his letter of the 29th ult., in his criticism of the position created by the extension of the National Insurance Act, Part II., in its application to gas undertakings.

It will be remembered that the Institution of Gas Engineers raised certain points with the Umpire, who did not accept the submissions made, and has certainly earned distinction by deciding that the cleaning of gas-cookers is an insured trade.

It is pretty evident that the intention of those responsible in drafting the Act of 1916 was to cover munition workers, who are generally in a position, from the wages they earn, to provide for future possible unemployment by paying the weekly contributions to the insurance fund. Indeed, they could probably have paid on a higher scale. It would look, however, as if money must be extracted from other sources; and thus it is that the regular employees of gas undertakings find themselves included, whether they want it or not.

At a time like the present, it seems very unfair that more complications should be inflicted upon the already harassed officials responsible for these undertakings.

With unemployment insurance for men employed in casual or intermittent operations, one can but have every sympathy; and I expect we are all only too glad to assist in this matter with casual or temporary employees if insured. With gas-works, however, the classification of trades—apart from employment—is undoubtedly unfortunate. It is the general policy, if I am any judge, for those responsible in such works to make employment satisfactory, so that employment becomes regular and permanent. To men so employed, there can be no attraction in the possible refund, as compared with permanency of employment; and, indeed, such men do not want it, and often resent application. Here the employer is unfortunately placed, because he has to bear the onus of such compulsory duties placed upon him by the Government.

It is probably due to the pressure of other matters that this new Act has escaped prominent notice until the present time. But there are many points which will need clearing up; and I for one should like to see its application to gas undertakings entirely abrogated as a compulsory measure. Possibly the new National Gas Council may be able to consider this matter in the near future.

CHAS. F. BOTLEY.

Hastings, Oct. 9, 1916.

Gas and Electricity for Water Heating.

SIR,—We have read with interest the comments in the "Electricity Supply Memoranda" for Sept. 19 as to the possibilities of electrical hot-water supply systems for domestic use. From the general survey of the latest system (separate tanks at each hot water tap), it appears that most houses would have to discard the use of their existing hot-water system, as no mention is made of using the electricity as an auxiliary only.

It is in this connection of interest to bring forward a few points regarding gas hot-water installations:

1. Take the gas-circulator. This is the cheapest type of apparatus in first cost, most easily erected, and gives the most convenient form of hot-water distribution throughout a home. The average net cost of erecting such an installation is somewhere about £2 15s.
2. Then there is the geyser. No doubt this is the most economical way of obtaining hot water; but in the larger houses it is perhaps inconvenient without another apparatus for kitchen and general supplies of hot water. The average net cost of fixing a geyser is £2 10s.
3. The next method (not greatly used at present, but assuredly the best under most circumstances where the latest ideas are wanted at the lowest possible upkeep) is the "Combination

System "—a geyser in the bathroom, and a small boiler over the washing-up sink. The average net cost of fixing is £3 5s.

Taking quite an impartial view of the possibilities of heating water in modern houses and allowing a very liberal margin of efficiencies checked by actual working results, gas is far ahead of electricity, even when giving the latter 100 per cent. efficiency, which, of course, is out of the question in use, however perfect the non-conducting material.

Cost to Heat 1 Gallon of Water from 45° to 150° Fahr.

	Gas.	Electricity (Allowing 100 per cent. Efficiency).
Gas-circulator	50 per cent. working efficiency 0·12d.	.. 0·3d.
Gas-geyser	80 ,, ,, ,, . 0·08d.	.. 0·3d.
Gas sink boiler	60 ,, ,, ,, . 0·11d.	.. 0·3d.

Gas reckoned at 2s. 6d. per 1000 cubic feet. Electricity at 1d. per unit.

RICHMOND GAS STOVE AND METER COMPANY, LIMITED.

132, *Queen Victoria Street, E.C*, *Oct.* 12, 1916.

REGISTER OF PATENTS.

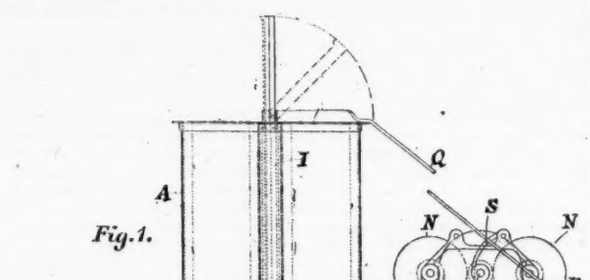
Charging and Discharging Vertical Retorts.

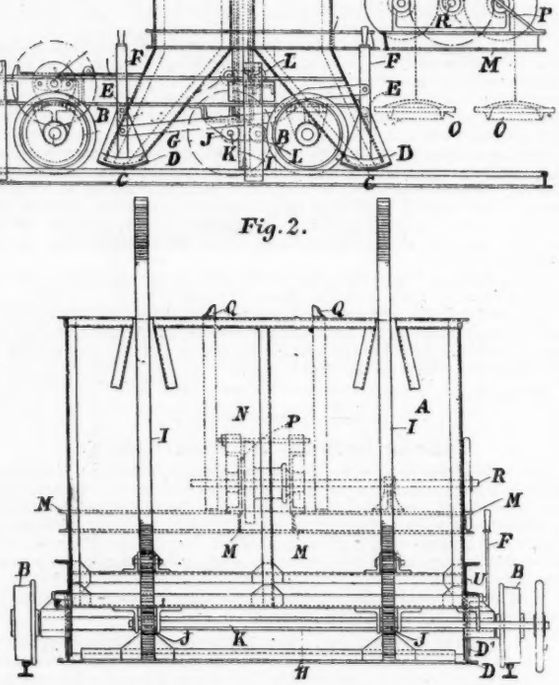
WELLINGTON, S. N., of Mark Lane, E.C.

No. 13,254; Sept. 16, 1915.

This invention relates to apparatus more especially for charging vertical retorts of oblong section, such as are described in patent No. 20,457 of 1914.

The charging apparatus is provided to operate two alternate retorts simultaneously, and is provided with winches by means of which the lids of the retorts that are to be charged are lifted and carried while the retorts are being charged; while a discharging or clearing piston or ram mounted upon the charging apparatus allows the retorts to be discharged where the charge may not have fallen out under the action of gravity.





Wellington's Apparatus for Charging and Discharging Vertical Retorts.

Fig. 1 is a side elevation of the apparatus, mounted to run upon rails over a battery of vertical retorts. Fig. 2 is a sectional front elevation, taken in a position between the hoppers.

The hopper A has two compartments whose lower extremities are directed outwardly at the front and back to form shoots, through which the contents are so discharged that two alternate retorts may be dealt with simultaneously. The hopper extends across the retort setting and is carried upon a frame mounted upon wheels to run upon rails. The lower end of each shoot has curved lateral edges C for the reception of a closing door D, provided with perpendicular segmental parts at each end by which the door at each end is pivotally carried in brackets E upon the shoot. Upon one side, and secured to one segmental part, an operating lever F is provided for each closing door; and a link G secures the levers together, so that the respective doors may be simultaneously operated. The link is for the purpose connected at one side to one operating lever at a point beneath the pivotal centre of the one door; while at the other side it is connected to the operating lever of the second closing door at a point above the pivotal centre.

Between the respective compartments is a clearing or discharging piston or ram H, adapted to have vertical movement imparted to it, by which it may be introduced into one of the retorts where it is required to clear the retort before charging, or where the charge may not have fallen out in the normal working of the retorts. For this purpose the piston is carried near each end by a vertical toothed rack I. The racks are adapted to have movement imparted to them by (say) pinions J mounted upon a spindle K in the space between the shoots and beneath the hopper compartments. The spindle is provided at its outwardly protruding extremity with an operating hand wheel, while further and freely mounted pinions may be provided in a position above the pinions J. Plain guide-rollers L are mounted behind the vertical racks I and in position in coincidence with the toothed pinions, so that the racks may be guided in their vertical movement. At their lower extremities the racks are connected to the piston H, or to a bar of a length and width corresponding to the mouth of the retort, and of such form as to be adapted to clear the retort of any obstruction or to positively clear the passage of the retort when the charge adheres to the sides of it.

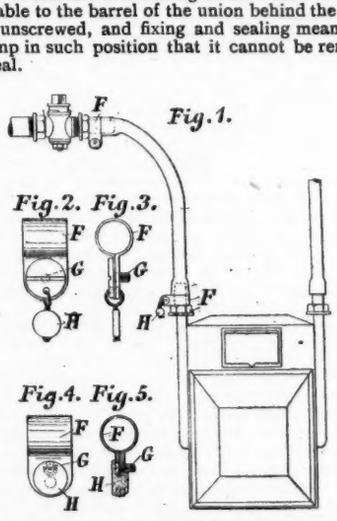
At one end of the hoppers is a horizontal frame M to carry two winches N, so that the apparatus can lift two retort lids O. The winches may be mounted upon vertical frames P carried by joists connected at one end upon the transverse frame member by which the hoppers are carried; while at the other end they are connected upon the outwardly extending frame which is supported by braces Q, the upper extremities of which are connected to the upper part of the structure. Between the two winches is an operating spindle R, to which is imparted an endwise movement, so that the spindle R may be employed to operate each winch. For this purpose the winches are mounted in adjacent and parallel positions, and their teeth are disposed on opposite sides; and the extent of movement of the operating spindle is such that the pinion mounted thereon may be moved from engagement with the teeth of one winch into engagement with the teeth of the other. Pawls may be provided adapted to engage with the teeth of the winch, and an arm S is adapted to lie in a position centrally between the alternative positions occupied by the operating pinion, so that the arm serves to prevent the accidental movement of the pinion from either of its positions of engagement.

Union Joint Connections for Gas-Meters.

WILLIAMS, S., of Cardiff.

No. 16,022; Nov. 13, 1915.

This invention has for its object to provide means for preventing the union joint connections between the inlets of gas-meters and the service mains from being disconnected without leaving evidence of such disconnection. It consists of a locking means—such as a metal clip or cramp—applicable to the barrel of the union behind the nut to prevent the nut being unscrewed, and fixing and sealing means for fastening the clip or cramp in such position that it cannot be removed without breaking the seal.



Williams's Meter-Union Connection Seal.

Fig. 1 is a front elevation of a meter with its union joint connections in accordance with this invention. Figs. 2 and 3 illustrate at right angles one form of the locking device or clip and seal employed. Figs. 4 and 5 show another way of sealing.

As shown, the meter is connected in the usual manner with the service main tap by a short length of lead piping and the ordinary union joint connections comprising nuts and barrels. The clip or cramp F, for securing the union joints, consists of a strip of metal bent to embrace the barrels of the joint behind the union nuts and having its ends fixed together by a screw G to be sealed with an official seal H, applied to a wire pressed through a hole in the screw and the ends of the cramp,

in the form of a disc. In figs. 4 and 5 the seal is in the form of a rivet, and covers the head of the fixing screw.

While the clip is in position it is impossible to unscrew the union nut, and before the joint could be disconnected the seal would have to be removed or broken.

Utilization of Pitch as a Fuel.—No. 101,444.

BÖLLING, G. H. H., of Christiania.

No. 5029; April 5, 1916. Convention date, March 25, 1916.

In industries where tar is worked up, the patentee remarks, large quantities of pitch are obtained as a bye-product, for which, in many cases, no profitable use could hitherto be found. Experiments have been made for the purpose of utilizing this pitch as a combustible; but its special properties "have proved an obstacle to its use for this purpose." His suggested process of effecting a continuous combustion of pitch is distinguished by the fact that the pitch is melted and introduced through heated pipes or channels into the furnace (or fireplace), where it is burnt in an atomized condition. This apparatus to be employed for effecting this continuous combustion of pitch converts it into a thin fluid condition in suitable vessels, by means of indirect heating with superheated steam; and the fluid pitch is introduced into the furnace through jacketed pipes and valves which are directly or indirectly heated, for instance, by means of steam supplied to the jackets —the pitch being atomized by means of steam or compressed air, and the pipes and valves being so arranged as to permit of the removal of any incrustation.

PARLIAMENTARY INTELLIGENCE.

Supply of Coal to Ireland.

In the House of Commons last Thursday, Sir J. LONSDALE asked the Chief Secretary if his attention had been called to the fact that important public bodies in Ireland had by resolution expressed grave apprehension with regard to the coal supply to Ireland in the coming winter, and urging the Government to take measures to ensure an adequate supply at reasonable prices, including sea carriage; and if he could state what action the Government proposed to take?

The PRESIDENT OF THE BOARD OF TRADE (Mr. Runciman): The Chief Secretary has asked me to answer this question. I find that shipments of coal to Ireland have so far been well maintained—indeed, the quantity shipped in August was unusually large. The question both of supplies and prices will be carefully watched, and such action as appears necessary will be taken.

Mr. P. MEEHAN asked the President of the Board of Trade if his attention had been called to the present condition of the coal supply in Ireland and the rise in the price; and whether steps would be taken to procure an adequate supply of coal at a reasonable price for that country?

Mr. RUNCIMAN replied that, as regards price, it would appear from cases which have been brought before the Board of Trade that the fact that the Price of Coal (Limitation) Act applies to coal shipped to Ireland is not always understood. Merchants and consumers who have reason to believe that they were being charged excessive prices at the pit would be well advised to communicate in the first instance with the Coal and Coke Supplies Committee for the district from which their coal was drawn.

Mr. MEEHAN further desired to know whether Mr. Runciman's attention had been called to the resolution of the Irish Association of Gas Managers in which they pointed out that the smaller gas-works would have to shut up unless something was done to secure an adequate supply of coal at a reasonable price?

Mr. RUNCIMAN: If these cases are brought to the attention of the Board of Trade, we shall endeavour to ensure for those companies the full benefit of the Prices Act.

Restricted Public Lighting Charges.

Mr. LLEWELYN WILLIAMS sought information from the President of the Local Government Board as to whether he was aware that the Town Council of Carmarthen, in compliance with an Order issued by the Secretary of State for War under the Defence of the Realm Act, reduced the number of lamps now supplied with electric light in the town to 32; that the contract entered into by the Corporation with the Carmarthen Electric Lighting Company provided for the lighting of 232 lamps in the streets; and that the Company refused to allow any abatements in the terms of the contract, with the result that the ratepayers were paying for the lighting of 200 lamps which are not lit; and, having regard to the possibility of similar conditions prevailing in other towns, whether he would introduce legislation to remove the grievance, or, if he would not introduce a General Bill, would not the Government provide facilities for the passing of a Private Bill dealing with the specific case of Carmarthen?

Mr. LONG replied that he was making inquiries into the matter, as he was not in possession of all the facts. His view was that in cases of this kind there ought to be some equitable arrangement between the parties; and he would consider what was the best course to adopt.

Lancaster Water-Gas Plant.—Sir N. W. Helme, M.P. (the Chairman of the Gas Committee), on Monday of last week, invited the members of the Lancaster Town Council and officials to inspect the new water-gas plant erected by Messrs. Humphreys and Glasgow. Mr. C. R. Armitage (the Gas Engineer) explained the working of the apparatus, which is producing 500,000 cubic feet per day. The visitors were entertained at tea, and Sir Norval paid a high tribute to Mr. Armitage for the efficiency of the works, and also sympathetically referred to the illness of his father, Mr. Charles Armitage (the Consulting Engineer), under whose superintendence the works enjoyed remarkable prosperity.

MISCELLANEOUS NEWS.

BIRMINGHAM AND THE CALORIFIC STANDARD.

A Gas Department Laboratory.

The Gas Committee of the Birmingham City Council, reporting on the Gas (Standard of Calorific Power) Act, 1916, state that the standard for Birmingham gas, following the practice at the time, was fixed many years ago as an illuminating standard of 15-candle power; but owing to the application of gas for all purposes of heating, both domestic and manufacturing, the calorific test of the gas is much more valuable for a city like Birmingham than the illuminating power test. The Committee therefore consider that it is in the interests of the Corporation to adopt the more scientific method of testing prescribed in the new Act, and so bring the department into line with other large undertakings. The Committee propose that the Town Clerk be instructed to make application to the Local Government Board for the substitution of a calorific standard of 500 B.Th.U. for the present illuminating standard.

Six years ago, the Gas Committee set up in connection with the department a laboratory, which was to bring to the notice of manufacturers the advantages of gas in connection with the various manufactures of the city. In addition to the laboratory, a small foundry was installed at the Windsor Street works, where experiments on a working scale could be carried out by consumers with their own workmen and their own materials. This innovation has more than justified itself, and has added very largely to the sales of gas; and the Committee believe it has been of considerable assistance to manufacturers who have availed themselves of the information supplied. The demands made on the organization—particularly during the last twelve months —have been very heavy, and in some cases have gone outside the original scope of the laboratory; information having been sought on subjects into which the application of gas did not enter.

The Committee are satisfied, from inquiries they have made from manufacturers and trade associations, that an extension of the scope of the present scheme would be welcomed, and would afford opportunities of undertaking valuable work, which would be of benefit to the numerous trades represented in the city; and the trade associations have promised their support. From these inquiries, it is clear that manufacturers are realizing the necessity of adopting the very latest scientific methods in connection with their business, and are keenly alive to any improvements which may forward trade after the war, and enable them to compete more successfully in other markets. It is proposed to undertake the testing of metals and alloys, chemical analyses, and research or investigation work. For the services of the laboratory it is intended to charge a scale of fees to cover expenses, thus making the scheme self-supporting, but not profit-earning.

The Committee believe that, to secure the best results, the scientific staff engaged should also have practical works experience, and they have only made appointments which will meet this condition. They are so satisfied that the extension of the present organization is necessary, that they have already given instructions for the purchase of the requisite scientific apparatus—which will cost approximately £2000. They recommend that Mr. C. M. Walter, B.Sc., who has successfully superintended the work in the past, be appointed Engineer-in-Charge of the laboratory, at a salary of £400 per annum, and that Mr. Victor E. Green be appointed Assistant Engineer at a salary of £325, as from the 1st prox. Other junior appointments have been made to increase the present technical staff.

SHEFFIELD "SUMMER TIME ACT" SAVINGS.

Interviewed by a representative of the "Sheffield Daily Telegraph," Mr. Hanbury Thomas, the Managing-Director of the Sheffield United Gaslight Company, told how about 5000 tons of coal had been saved by them in consequence of the extra working hour of daylight between May 21 and Sept. 30 (inclusive) this year. He said that a very tangible method of ascertaining, as far as it was possible to do so, the amount of saving affected was adopted by the Company. They took the consumption of gas between the hours of 8 and 12 p.m. in the week ending May 20, which was the week before the Daylight Saving Act came into force, and also in the two weeks ending May 27 and June 3, when it was found that the difference in the consumption of gas was, in the week ended May 27, 3,121,000 cubic feet, equalling 284 tons of coal, and for the week ended June 3, 3,128,000 cubic feet, equalling 285 tons of coal. Mr. Hanbury Thomas pointed out that as the days, of course, lengthened out during June and grew darker in July, August, and September, 3,128,000 cubic feet would be rather less than the average saving per week for the whole period. The present price of gas to general consumers is 1s. 9d. per 1000 cubic feet; having been raised in July, 1915, 6d. per 1000 cubic feet on account of the extra cost of coal due to the war. Roughly speaking, it was estimated that the saving in coal during the period in which the Act was in force is about 5000 tons.

TRADE AFTER THE WAR.

Tottenham Manufacturers and Organization.

Nearly one hundred large manufacturers of Tottenham and district, representing between thirty and forty different trades, including the gas industry, met, with the sanction of the Board of Trade, in a Committee Room of the House of Commons last Thursday afternoon for the purpose of conferring upon the subject of British Trade after the War. This was the first gathering of the kind held in this country; the object being to organize the manufacturing resources so that Great Britain would be prepared to compete successfully with other countries

after the declaration of peace in capturing the extensive trade formerly carried on by Germany. Mr. A. E. Broadberry, M.Inst.C.E., the Engineer and Manager of the Tottenham and District Light, Heat, and Power Company, presided.

Mr. Broadberry said in the earlier stages of the war, a Metropolitan Munitions Committee was formed with the object of inducing firms throughout the Metropolitan area to adopt munition work. There was an Outer Northern Section formed, which embraced the Tottenham district; and he was asked by the Committee to act as Chairman of the branch. In this capacity it was the duty of his Committee to do all they possibly could to induce firms throughout the neighbourhood to give up the ordinary work of their industries—to abandon their factories practically—and help in providing the nation's needs. They were even instructed to suggest that, unless they were prepared to do so, it might become necessary to commandeer their machine tools and that sort of thing, so that, if they did not work voluntarily, there might be some sort of compulsion applied. Many of them went out of their way to meet the necessities of the time, and had since devoted themselves to Government work. It behoved them now to look ahead and see what the future was going to be. Unless some good organization was got together, there seemed to be a prospect that the large new factories and all the new plant, as well as the thousands of workers, would be suffering from want of employment. No doubt after the war there would be a tendency for a boom in trade; but the greatest good would come to those who were best organized. It was with this object that the meeting was held—so that they might consider what was the best means of inducing some of the trade boom to flow in the direction of Tottenham and the surrounding neighbourhoods. The proper thing to do was for the manufacturers to organize and form an Association, which might be able to watch for work which was going in the country; and if any of it was suitable to the factories in the neighbourhood, it could be allocated to those capable of dealing with it. Tottenham was very well served for transport, and there were other facilities, including very good supplies of gas, electricity, and water. Perhaps in one regard it was unsuitable—the rather high assessment of factories. He believed a good deal of Germany's trade could be captured.

Mr. Percy Alden, M.P. (Tottenham), dealt at length with the question of social and economic construction after the war. He remarked how deeply interested the Board of Trade were in any well-considered proposal tending to secure prosperity to British trade after the war.

Major J. R. P. Newman, M.P. (Enfield), and several manufacturers took part in the conference, after which it was decided to appoint a Sub-Committee to submit a scheme for the formation of a Tottenham and District Trade Association.

Gas Companies' Protection Association.—The nineteenth annual general meeting of the Association will be held at Caxton Hall, Westminster, S.W., on Thursday, the 26th inst., when the annual report of the proceedings of the Association and the accounts and balance-sheet for the year will be submitted.

MEETING OF BRITISH DYES LIMITED.

A General Meeting of Shareholders in British Dyes Limited was held last Thursday, at Huddersfield—Mr. JAMES FALCONER, M.P. (the Chairman), presiding.

The CHAIRMAN, in moving the adoption of the report and accounts [see "JOURNAL" for Aug. 22, p. 356, and Oct. 10, p. 99], said that the year ended April 30 had been a strenuous one in every aspect of the Company's business; but he thought they had presented what might be justly described as a satisfactory report and balance-sheet for the first year of an undertaking such as theirs. The amount of the subscribed capital, not all fully paid-up, and the loan capital to which they were entitled from the Government at the date of the statntory meeting held last year, represented a sum of £1,512,198. At the close of the year dealt with in the accounts, the capital was £1,851,914 showing an increase of £339,116; and to-day the capital stood at £1,976,342, showing a total increase as between July 5, 1915, and Oct. 12 this year of £464,144. This steady increase in the subscription to capital was a gratifying feature of the Company, showing that it had secured, as time went on, the confidence of people who might have entertained some doubt at first as to the wisdom of subscribing. Another gratifying feature was the fact that very substantial subscriptions were coming from Canada, India, and Australia, showing that throughout the Empire the effort to establish a national supply of dyes was meeting with a great deal of support. With regard to the year's working, there was a balance to the good of £65,982, after providing a sum of £200,000 for increased cost of construction during the war, and for depreciation and obsolescence of buildings and plant. This ought to be regarded as a not unsatisfactory result of the first year's working. As to the £200,000, he remarked that they had to bear in mind the difference between the cost of the buildings and plant put up during a period of exceptional prices and their post-war value. Nobody, however wise, could tell what the post-war value would be; but they had to fix on a definite sum. When they came to look at the matter, they felt they would not be justified in withholding the interest payable on the Government loan, because the profit had been made; and they thought it right that those who had contributed the capital to the concern should receive the 6 per cent. limited dividend.

BOARD OF TRADE ACTION CAUSES "PROFOUND SURPRISE."

One or two outstanding matters had been occupying the attention of the Board, and perhaps the most important of all was the question of the supply of indigo. They had always regarded this as a matter of first-class importance to the textile industries. When the Company was formed, the only works in this country capable of producing indigo were those at Ellesmere Port, which were then being run by a Controller put in by the Government. Immediately after British Dyes Limited was formed, they had applications from the Controller for the supply of aniline oils to enable him to manufacture indigo. So far as

"Such advantage as there proves to be."

Richmond's "R.H.D." (Radiant Heat Distributor) Gasfire.

Expressions of appreciation and congratulation continue to reach us concerning the "R.H.D." Gasfire, and the following is typical of many recent communications:—

Oct. 7th, 1916.

". . . We are delighted with the Gasfire. I confess I was not prepared to find such advantage as there proves to be in the convex distribution of radiants."

——— B.Sc., F.R.S.

The first Gasfire to uniformly distribute the high percentage of radiant heat emitted by the modern Gasfire.

THE RICHMOND GAS STOVE & METER CO., Ltd.,

WARRINGTON AND LONDON.

it was in their power, consistently with their other obligations, they gave him supplies on terms to which no exception could be taken, and did everything they could in this way to help him to run the works. By far the largest part of his aniline oils was supplied by them. The Company also obtained a large consignment of indigo from abroad, and distributed it among their own members who were indigo users. Further, they secured a process for the manufacture of indigo—not the Ellesmere Port process—and the assistance of a chemist and engineer familiar with the working of it; and they were making ready to put up a plant for this purpose. At that time they had no reason to expect that the Ellesmere Port process would not continue to be run by the Government; and it seemed advisable to take advantage of the process referred to, so as to augment the supply of the country. When they found that the Trading with the Enemy Committee were considering the winding-up of the Ellesmere Port undertaking, they made immediate application to be allowed to tender for the purchase of the works, if it were decided to sell them. They made a provisional agreement with their French friends for a dye-making alliance between the two countries, and found there was running in France a plant almost identical with that at Ellesmere Port; and the French were good enough to say they would place at their disposal the services of the engineer who designed the Ellesmere Port works and taught the Germans how to run them. Having thus placed beyond possibility of question their ability to work the plant and manufacture the indigo, they put the information before the Board of Trade with a view to being allowed to tender; and it was a profound surprise—even a shock—to every member of the Board when the reply came saying that the Board of Trade considered that only Messrs. Levinstein should be allowed to tender for the Ellesmere Port plant. They had pressed as far as they possibly could with politeness, and perhaps a little bit further, for the reasons for this step; but no reason had been given. He did not wish to indulge in language that would lead to friction, but he did want the shareholders to understand that the Directors had being doing everything they could to provide for their needs in this important particular, and had placed themselves in the position of being able absolutely to undertake the manufacture, so far as the supplies of material were available.

THE FOUNDATION WELL AND TRULY LAID.

As to preventing overlapping among dyemakers, so that two concerns should not produce the same thing when one plant would suffice, the first thing was to ascertain the requirements of the country in respect to the different dyes; and so far this difficulty had been overcome. With regard to the combination of different companies, they had always been prepared to consider any feasible proposal; but, having a limited amount of capital, they came to the conclusion that the best use they could put the money to was in the erection of new buildings. The all-important thing, if they were going to found an industry for dyes in this country, was to provide for the manufacture of the intermediate products out of which the dyes were ultimately made. Before they arrived at the products from which the dyes were made, they might have a dozen different processes, each giving a different chemical product; and they were helpless, unless they could produce the series of intermediates from which the final product was obtained. Without the acids which were essential for the manufacture of the intermediates and the dyes, they would be just as helpless at the end of the war as before—possibly more so, because they might not be able to get the intermediate products from Germany. The real stress and difficulty were not going to be experienced during the war. They had turned out greatly increased quantities of dyes; but competition did not exist during the war in the same sense that it did in normal times. They were devoting their main energies to putting up plant, and carrying on the research necessary to enable them to manufacture the intermediate products which were the real key and secret of the business. His opinion was that they had been laying the foundation in the right way, and proceeding on the right lines, and that it would be found, as time went on, that the foundation of this great industry had been well and truly laid.

The report and accounts were unanimously adopted; and a dividend of 6 per cent., less income-tax, was declared.

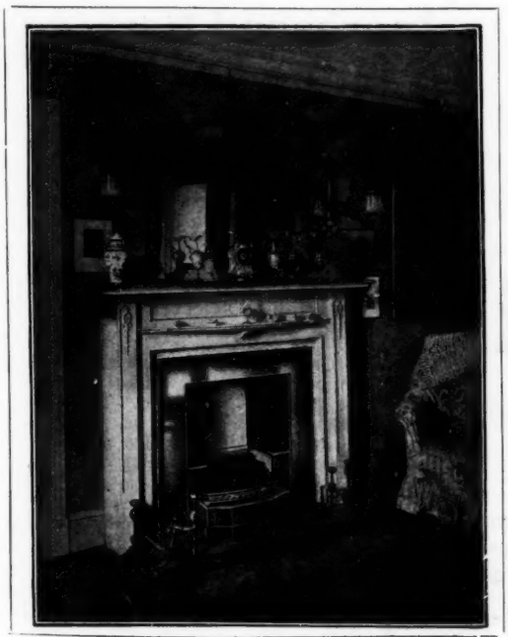
The election of Dr. M. O. Forster and Mr. Joseph Turner to the Board was confirmed; and, in responding, Mr. TURNER (who is also the Manager of the Company's works), predicted that Germany would lose the aniline dye industry as a consequence of the war.

USE OF ELECTRICAL ENERGY.

Birmingham's Suggestions and Experience.

Last Thursday, the "Birmingham Daily Post" devoted the best part of a column of space to describing a stoppage of the city tramway service through a breakdown of the machinery at the Nechells power station. It is true that this is not the first occasion on which inconvenience of this character has been imposed upon the travelling public; but hitherto the suspension of the cars has been for more or less brief periods, while this time it is anticipated that the trouble will involve a curtailment of the daily services for probably the next three weeks. The most striking point, however, about the account of the accident is that it followed just three days after the same paper had published an abstract of the Presidential Address of Mr. R. A. Chattock (City Electrical Engineer) to the Birmingham Association of Mechanical Engineers.

Our contemporary reports the President as having said that coal ought not to be wasted as it has been to a large extent in the past. A Committee of the British Association had been appointed to report upon the subject, both with a view to economizing the use of fuel and for the prevention of smoke; and their deliberations, so far as they



Suitable for use in all Modern Interior Coal Grates.

Artistic Gas Fires.

THERE are many of them, of course, but have you studied the "St. Nicholas" types?

The "St. Nicholas" Gas Fire is a happy combination of the three essentials:

Effective Radiation.
Effective Ventilation.
Effective Appearance.

And the result is *the* Gas Fire.

Low in Price and Easy to Fit.

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R. & A. MAIN, LIMITED.

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SHOWROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.; 136, Renfield Street, **GLASGOW**; 83, Old Market Street, **BRISTOL**; 18, Severn Street, Deansgate, **MANCHESTER**; 97, Millfield, **BELFAST**; 333, Queen Street, **MELBOURNE**; and 12, Cunningham Lane, Pitt Street, **SYDNEY, N.S.W.**

had gone, led one to believe the greatest economy in the use of coal could be obtained by gasifying it and recovering its valuable bye-products. It was impossible for individual manufacturers to do this with anything like the economy that could be obtained if the whole of the coal used in the country were so treated at certain convenient centres. The transformation of the energy in the coal into electrical energy was the one link that rendered a scheme of the kind possible, because if all the coal consumed in the country was so treated at certain centres the energy produced would have to be transmitted all over the country for use wherever it was required; and the only way of doing this with reasonable capital expenditure was electrically. Electrical energy could now be efficiently applied to all purposes for which coal was used; and if energy could be produced and transmitted at a figure that compared favourably with what it at present cost the consumer to supply himself, the justification for such a scheme was made out. The production of electrical energy from such a scheme at a cost far below that which obtained at the present time would make it possible for all users of coal economically to employ electrical energy in substitution for coal. It was doubtful, however—owing to the conservative nature of the average man—whether such a change could be brought about quickly enough to justify the erection of the large super-stations that would be necessary, and to make them pay for themselves within a reasonable time, without some special steps were taken for the purpose. Compulsion might be exercised directly by Government control of the coal supply of the country, or indirectly by putting a tax on all users of coal who consumed it in an uneconomical manner—the tax being utilized for financing a scheme of the kind he had indicated until it became self-supporting. Compulsion, in his opinion, would be justified, having regard to the national importance of the results that would be obtained by the proper conservation of the coal supply of the country, by the elimination of smoke from the atmosphere, by the possibility of giving a supply of power to manufacturers and other users at a figure so low that it would represent a saving in their cost of production, and by relieving the congestion on the railways owing to the reduced traffic of coal, which at present had to be delivered all over the country, and under the suggested scheme would only have to be delivered by special lines to certain centres.

The "Post" has since stated, as an explanation of the cause of the latest breakdown, that too great a strain, of an exceptional character, has been imposed upon the electrical supply plant of the Corporation for some eighteen months; and it has not been possible to relieve this strain by materially increasing the machinery. Enormous quantities of electricity have been required for munition works, running day and night. This requirement has, at all costs, had to be satisfied; and, at the same time, every endeavour has been made to meet the ordinary demands for lighting and trams. The power was ample to meet all pre-war demands; and if only pre-war demands were prevailing now, such a breakdown would have occasioned no difficulty.

TRAVANCORE MINERALS SALE.

In view of the fact that yesterday was the date fixed by the Public Trustee as the last day for receiving tenders for the purchase of 29,998 shares in the Travancore Minerals Company, Limited—holdings formerly in the possession of Germans—last Friday's "Evening News" had a long article on the "End of the German Control of Gas-Mantles"—giving particulars of the in-and-in dealings of the Berlin Company who have so long controlled the world's stock of thorium.

As our contemporary points out, this is perhaps the most important sale of enemy holdings ever held, as the whole of the gas industry, so far as the consumption of gas is concerned, depended before the war, and does so now, upon the production by this Company of thorium nitrate, without which gas-mantles cannot be made. In his advertisement of the sale, published on Sept. 23 [see "JOURNAL" for Sept. 26, p. 628], the Public Trustee announced that the transferee must be a natural-born British subject, and would have to make a sworn declaration as to nationality and freedom from foreign control.

Most of the particulars are well known to "JOURNAL" readers, but the "Evening News" summary of the events may be of interest. The fact is emphasized that before the war the Germans held such a grip of the world's deposit of monazite sands that they were able to dictate to gas-mantle makers, and to make them dependent upon them. A short time before the war the English gas-mantle makers were summoned to Berlin by the German ring, and informed that unless they agreed to limit their output, their supplies of thorium nitrate, which the Germans made from monazite sand obtained from India, would be stopped.

The original owners of this Indian concession to mine monazite sand were the Cosmopolitan Mining Company, of London, whose shares were held by Anglo-Indians and Indians. The Germans coveted the concession, although the Indian Government had specially provided that none but an English company should hold it. In the letter this provision was observed, through the nominee system; the Germans, so far as control was concerned, remaining in the background. It was only when war broke out that the Indian Government discovered how the nominee system had been worked. They at once made Sir John Hewett Chairman of the Company.

The real holders of the bulk of the shares were the German Gas Light Company; the ostensible holders of all the preference shares, and half the ordinary shares, were the General Electric Company of this country.

When Sir John Hewett took the chair of the Company for the first time in July, 1915, he gave some astounding facts. Here, he said, was a Company, which controlled a product vital to the welfare of the gas industry in this country, allowed to get into the hands of the General Electric Company, which, however strong its British constitution may be, had German parents. This Company entered into an agreement in December, 1911, to form a Company to take over and work the lease granted by the Indian Government to the Cosmopolitan

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Mining Company, conditional that a transfer could be made only to a *bonâ fide* British concern. The General Electric Company subscribed £20,000 in shares to the Travancore Minerals Company, which they formed, and received, by way of commission, £10,000 in ordinary shares in the Travancore Minerals Company—the Cosmopolitan Mining Company receiving £10,000 in cash and £10,000 in ordinary shares. Inquiries, said Sir John Hewett, instituted after the war, disclosed the fact that the whole of the preference shares and 11,000 of ordinary shares—10,000 of the holding of the Cosmopolitan Company, who received 10,000 ordinary shares, having been transferred since 1911—were held in trust for the Deutsche Gaslublicht Gessellschaft of Berlin, and not on account of the General Electric Company. The Company, he said, had in previous years transferred the whole of their output to a German company called the "Germania," under an agreement which has now terminated.

The shares to be sold are those held in trust by the General Electric Company of this country on behalf of the German Gaslight Company.

NOTES FROM SCOTLAND.

Dark Streets and Luminous Paint.—When attention was drawn at a meeting of the Lighting Committee of the Dundee Town Council to the dangerously dark condition of the streets of the city, the Convener (Mr. Allan) replied that the police authorities had the matter in hand, and that Mr. A. Yuill (the Gas Manager) was experimenting with a luminous paint, which would be a guide at all dangerous places. A demonstration was given of the properties of the luminous paint; the room being made dark. Some of the members saw the light developing, while others did not; and the meeting agreed that the paint had not been given a fair trial. The public, it was stated, would be likely to have an opportunity of judging of its efficacy at no distant date.

More Light Wanted in Glasgow.—There is a growing demand in Glasgow for something more in the shape of street lighting than is available under the present severe restrictions. While the importance of darkness is admitted, it has been advanced in some quarters that a modification of the lighting arrangements might be possible without endangering the public safety, inasmuch as the national system of communicating warnings to all parts of the country has now been developed, if not to perfection, at least to a state of remarkable efficiency. Interviewed on the subject by a representative of the "Glasgow Herald," the Chief Constable said the public should remember that it is wartime, and that there is danger. Darkness and silence make for safety.

Price of Gas at Sanquhar.—The price of gas at Sanquhar is to be raised 5d. per 1000 cubic feet, to 5s. 5d. and 5s. 10d. Last year there was a loss of £100 on the concern.

Dundee Gas Workers' Wages.—Arbitration proceedings in connection with the Dundee gas workers' request for an increase of wages took place last week. The claim, which was for an advance of 1d. per hour, was made by all the employees at the gas-works, with the exception of tradesmen, whose wages are regulated by the Trade Union. The gas-works being a controlled establishment, the matter was referred to the Board of Trade, who appointed Sheriff A. O. M. Mackenzie, K.C., of Edinburgh, to arbitrate on the demand. The sitting was in private; and at the close judgment was reserved.

Gas Lighting Centenary in Edinburgh.—A good account of the introduction of gas lighting into Edinburgh is to be found in last Saturday's "Weekly Scotsman." The writer is Mr. W. Forbes Gray; and he gives quotations from old publications which enable one to follow some of the city's early gas-lighting experiments. It was in November, 1816, that John Grafton, a young English engineer, arrived in Edinburgh for the purpose of fixing on an eligible site upon which to erect works, in order to light the city with gas. He was, it seems, accompanied by some leading citizens; and a site was chosen in New Street, where ultimately were erected the works the last portions of which are now being demolished.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Oct.* 16.

Creosote is reported to have been sold at a price equivaleut to over 3¾d. net per gallon, f.o.b. London. Pitch is steady at 20s. to 21s. net per ton, *ex* makers's works. There is nothing of importance to report about other tar products, the prices of which are unchanged.

Sulphate of ammonia is in a strong position; and for export £17 12s. 6d. net per ton in buyers' bags *ex* producers' work is asked for 25 per cent. quality.

Tar Products in the Provinces.

Oct. 16.

There is little or no change in markets, and prices remain the same as last week, with the exception of naphthalene, which is decidedly easier and looks like going still lower, as there has been a big drop in the value of refined of all grades. Pitch continues quiet, and business is difficult to negotiate. Creosote oil is very slack. Stocks appear to be accumulating, and are going to cause trouble in the winter. Solvent naphtha is in good demand. Heavy naphthas are quiet.

The average values of gas-works products during the past week were: Gas-works coal tar, 15s. 6d. to 19s. 6d. Pitch, East Coast, 16s. to 16s. 6d. per ton; West Coast—Manchester 15s. to 15s. 6d., Liverpool 16s. to 16s. 6d., Clyde 17s. to 18s. Benzol, 90 per cent., North, 10½d. to 11½d.; 50 90 per cent., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 10d. to 1s. 11d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote,

in bulk, North, 2d. to 2½d. Heavy oils, in bulk, North, 3d. to 3½d. Carbolic acid, 60 per cent., East and West Coasts, 3s. 4d. naked. Naphthalene, £20 to £30; salts, 70s. to 80s., bags included. Anthracene, "A" quality, 2½d. to 2¾d. per unit; "B" nominally ¾d.

Sulphate of Ammonia in the Provinces.

LIVERPOOL, *Oct.* 14.

There has again been practically no change in the market for this material during the past week, and little business has taken place so far as the export trade is concerned. Towards the close some more licences have been granted, but only for a small quantity compared with that for which applications have been lodged. The nearest values for prompt delivery are still £17 12s. 6d. per ton f.o.b. Hull, £17 15s. f.o.b. Liverpool, and £17 17s. 6d. f.o.b. Leith. In the forward position, buyers have not shown much interest, and no first-hand transactions have been reported.

Nitrate of Soda.

This market is the turn easier, and quotations on spot have been reduced to 17s. 7½d. per cwt. for ordinary, and 18s. 1½d. for refined quality.

Sulphate of Ammonia.

From another source, it is stated that this article is unchanged, and prices remain at about the same level as last week. The quotations are as follows: Outside London makes, £16 15s.; Hull, £17 12s. 6d.; Leith, £17 17s. 6d.; Liverpool, £17 15s.; Middlesbrough, £17 12s. 6d.

COAL TRADE REPORT.

Northern Coal Trade.

Though the demand is generally good for coal, the slowness of arrival of some of the steamers has made the market quiet. The shipments of coal from the Tyne ports for the first three quarters of the year are roundly about 600,000 tons less than they were in the same period of last year; but the shipments of coke show a considerable increase. With shipments restricted, prices are easier. For best Northumbrian steam coals, from 37s. to 40s. is quoted—the exact price depending upon the time of delivery. Second-class steams are near 30s. to 32s. 6d. per ton; and steam smalls are from 17s. 6d. to 22s. 6d. per ton—all f.o.b. Tenders are being sent in for 18,000 tons of best steams for Norway, for delivery next month; and it is thought that the prices given above will be near the quotations that are likely to be made. In the gas coal trade, the demand is improving, and the market is steady. The output is well taken up; and the prices are being maintained. Best Durham gas coals are 35s. per ton f.o.b.; while second-class gas coals are 27s. 6d. to 28s. per ton. "Wear Specials" are about 35s. 6d. to 37s. per ton f.o.b. There are few new contracts for gas coals in the market; but those that are running take up a large part of the production. Freights are firm generally. Gas coal from the Tyne to Genoa has now quoted a freight of about 74s.; while in the coasting trade, the Tyne to London rate is still about 12s. Of course, many freight contracts and time charters for steamers are running at lower figures; but how winter will affect those that expire remains to be seen. The coke market is firm, and the demand continues full both for home use and for export. Good gas coke is quoted from 34s. to 35s. 6d. per ton f.o.b.; the variation being according to the time and place of shipment. The freight on coke exported is very high, even to controlled French ports—from 37s. 6d. to 40s. having been paid in the last few days to different ports in the north of France.

Gas Light and Coke Employees and the War Bonus.—A meeting was held on Sunday at the East Ham Town Hall of members of the Gas-Workers' Union in the employ of the Gas Light and Coke Company, at which those present resolved "that, having considered the correspondence that has passed between the Union and the Company, they request the District Committee of the Union to arrange for holding a ballot as to the advisability of handing-in notices for a cessation of work." Mr. Will Thorne, M.P., said the Company's attitude was that they had already granted a 7s. war bonus, and were not prepared to do anything further. In the case of the railwaymen, however, the Government had recognized that 7s. was not enough to compensate for the higher cost of living.

Exemption Applications at Ryde.—At a sitting of the local Tribunal, Mr. F. Farrand (the Manager) appealed for three of the employees of the Ryde Gas Company—Joseph E. Cocker, timekeeper and storekeeper, Edward R. Ebelthite, gas-fitter, and Frederick J. Tabor, gas and meter fitter. The military dissented in the cases of Cocker and Tabor, and assented to conditional exemption for Ebelthite. Mr. Farrand said 48 workmen were employed by the Company before the war; and now they only had 21. The Company had 4000 consumers. Owing to the increased price of gas, the slot-meters would have to be fitted with new wheels. Asked whether he had tried to find any one to take Cocker's place, Mr. Farrand said he had advertised and been to the Exchanges at Portsmouth and Cowes, but without result. The men would not come over from the mainland. Mr. Colenutt (the Military Representative) said many men of military age at the works had been exempted. Questioned as to whether there was anything wrong with one of his hands, Tabor showed his left hand, which had lost two fingers. Mr. Colenutt said he was not aware of this. Mr. Farrand added that he expected to be very busy fitting out fifty houses which had been taken by the military for the troops coming to the town. The application in respect of Cocker was dismissed, Ebelthite was told to get into munition works, and Tabor was granted conditional exemption.

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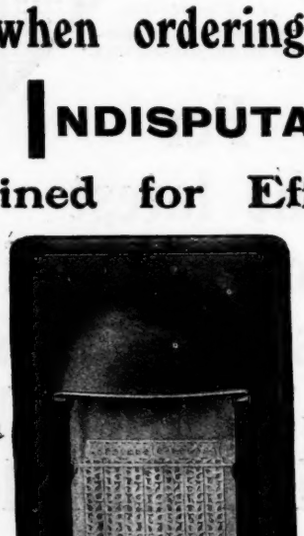

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Dawlish Gas Manager and Military Service.

Further consideration was given by the Dawlish Military Tribunal yesterday week to the case of Mr. H. Vesey, the Manager of the Dawlish Gas-Works, who is badged, but who it was suggested by the Ministry of Munitions might be passed for the Army and his place taken by a former Manager who had offered to do war work. The Clerk stated that since the last sitting [*ante*, p. 99] he had received a letter from the Ministry of Munitions asking the Tribunal to consider the question of Mr. Vesey remaining in civil employment, apart from the question of substitution. Mr. Vesey stated that he was appointed Manager on May 15, 1914, and had control of the undertaking. Three men besides himself were badged, but two were over military age; and an official of the Ministry of Munitions who visited the works three or four months ago came to the conclusion that none could be spared. No one at the works was capable of taking his place; and a Gas Manager could not be trained in a week or two. In reply to the Military Representative, Mr. Vesey said nothing of national interest was produced at the works except toluol; and if the supply of this were stopped, it would mean shortage of a certain number of shells. Mr. J. A. Gray (a Director of the Company) said that if Mr. Vesey was called up, they would do their best to keep the works going; but he did not know how it could be done. It was impossible to get a Manager by advertising; for in nearly every case assistants had been taken away, and the Managers who were left were usually the only men in responsible positions at gas-works. A member of the Tribunal pointed out that they had to consider the matter from a national standpoint, and not the interests of the shareholders. Mr. Gray: Surely it is in the national interest that the supply of gas should be kept going. In answer to the Military Representative, Mr. Gray said he was Manager of the Teignmouth Gas-Works. He did not think he could offer to undertake Mr. Vesey's work if he were called up, as he would be unable to give sufficient time and attention to it. In addition to the toluol, a certain quantity of ammonia was produced. It was impossible to entrust the Manager's duties to anyone at the works. The Tribunal did not announce their decision, which is to be communicated to the Ministry of Munitions.

Leeds and the Calorific Standard.—In connection with the intention of the Leeds Corporation to seek power from the Local Government Board to substitute a calorific standard for the illuminating power standard, the "Leeds Mercury"—reporting an interview with Mr. W. B. Leech, the Engineer and General Manager of the Gas Department—says: "The ratepayers will doubtless welcome the news that, under the new method, gas can be produced at slightly less expense."

Oxley and Hird, Limited.—A Company with this title has been registered to carry on the business of manufacturers of coal-tar products and colours, manufacturing chemists, druggists, importers and exporters, and manufacturers of, and dealers in, chemical products of all kinds. Nominal capital, £25,000 in 10,000 £1 preference shares and 15,000 £1 ordinary shares. The Directors and subscribers are: J. C. Oxley, of Guiseley, chemical manufacturer, and Mr. H. P. Hird, of Hipperholme, Halifax, chemical engineer.

Bland Light Syndicate.—The eighth annual general meeting of this Company was held at No. 29, Little Trinity Lane, E.C., last Friday. The Chairman (Mr. F. J. Gould) reported that the results obtained continued to be of a satisfactory nature, and this in face of great difficulties in trading—mainly attributed to the enormous rise in the cost of material, together with difficulty in manufacturing. The demands made by buyers during the period under review had not been quite ordinary. Goods had been required to meet the altered conditions of trading, for which it had been very difficult to cater. Sixteen men of the staff had joined the Colours—including three travellers; but the difficulties were being gradually surmounted, and the shareholders could look forward with confidence to the future. An interim dividend at the rate of 6 per cent. per annum for the six months ended Oct. 31, 1915, was paid in July; and it was now decided to make a further distribution at the rate of 10 per cent. per annum—making 8 per cent. for the year.

Gas-Works Coke for Gas Consumers.—Attention was drawn by Mr. Roebuck, at a meeting of the Holmfirth Urban District Council, to the action of the Holmfirth Gas Company in refusing to sell coke to ratepayers who used electricity instead of gas. He said he did not want the Council to meet and find they had no heating apparatus at work; and he therefore moved that the Surveyor be authorized to get coke from another source, if the necessity arose. Mr. Barker said it was not for the Council to set up their backs until the Gas Company had done so. The Surveyor said he had been informed that day by the Gas Manager (Mr. A. E. Buckley) that the Company had decided that, as they had to make gas to produce coke, they would only sell coke to gas consumers. He informed the Manager that they used gas in the caretaker's house; and for anything he knew this put the Council right. Mr. Roebuck said his resolution only prepared them for emergencies; and it was thereupon agreed to.

Gas Workers' Wages in Australia.—According to a Government return dated May, 1916, just received in London, the following are the rates of wages ruling or fixed by Award Courts for certain adult male workers in the gas making and supply industry for (except where otherwise mentioned) a 48-hour week. Sydney: Gas-fitters, 72s.; main-layers, 70s. and 78s.; meter-makers, 66s.; meter-testers, 54s. and 60s.; service-layers, 60s.; stokers, 66s. Melbourne: Gas-fitters, 73s. 4d. (44-hour week); meter-makers, 72s.; meter-testers, 60s.; service-layers, 59s.; stokers, 68s. Brisbane: Gas-fitters, 60s. 6d. (44-hour week); main-layers, 56s. 10d. to 60s. (46-hour week); service-layers, 56s. 10d. and 62s. (46-hour week); stokers, 79s. 4d. (56-hour week). Adelaide: Gas-fitters, 62s.; service-layers, 66s.; stokers, 82s. 6d. (56-hour week). Perth: Gas-fitters, 78s.; main-layers, 72s.; meter-makers, 72s.; service-layers, 66s.; stokers, 66s. and 73s. 6d. Hobart: Gas-fitters, 69s.; service-layers, 58s.; stokers, 64s. 6d. The minimum wage of lamplighters in Sydney is 63s. for a 56-hour week; in Brisbane, it is 48s. 9d. to 50s. for a 42-hour week; in Perth, 55s. for a 48-hour week. Where two rates are quoted, the reason is that different rates have been fixed for various grades of work.

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Munition Workers and "T.N.T." Poisoning.

At an inquest held in London last Friday on Lydia Elizabeth Gibson (aged 24), a woman examiner at a munition factory, who died in St. Bartholomew's Hospital the previous Sunday, as the result of "T.N.T." poisoning, the Coroner (Dr. Waldo) commented upon the fact that a post-mortem examination had been ordered by the Home Office without his knowledge. The Home Office, Dr. Waldo remarked, had no right to order any post-mortem examination. In common law it was the duty of anybody—doctors or the public—to report to the Coroner of the district where the body was lying; but no one had any right to interfere with the body. In this case he ascertained that on Monday, to his great surprise, a post-mortem examination had been made at St. Bartholomew's Hospital, without any order from him. Upon ascertaining the position, added Dr. Waldo, he got Dr. Spilsbury to make a post-mortem examination. Dr. Spilsbury said death was due to disease of the liver and fatty degeneration of the heart and kidneys, consequent upon poisoning by "T.N.T." When a person had symptoms of poisoning, he said he or she should stop work at once, and no doubt recovery would take place. Death might occur in spite of all regulations. The Jury returned a verdict of "Death from misadventure," and added a rider expressing the opinion that all examiners and other persons engaged in munition works, whether by the Government direct or not, should be under all the regulations referring to the preventive measures. At an East London inquiry into the death of Annie Newson, 38 years of age, who was employed in a munition factory mixing "T.N.T." and other ingredients, it was stated that in the twelve months during which the work had been going on at the factory, there had only been one other case. Dr. Christine Pillman, who is engaged at the factory, expressed the opinion that, taking the arguments for and against respirators, they were distinctly against the use of them; and, moreover, the workers did not like them. The Jury returned a verdict of "Death by misadventure."

Gas-Workers' Wages at Sunderland.—As a result of negotiations between the Sunderland Gas Company and the District Secretary of the National Union of General Workers, the Company have made the following final offer, which has been accepted by the employees: To all eight-hour shift workmen, 4d. per shift increase; to all gas-fitters' labourers, &c., 2s. 6d. per week increase; to all women and youths, 1s. 6d. per week increase.

Burton Gas Workers and the Cost of Living.—The gas workers and unskilled labourers of the Burton-on-Trent Corporation have sent in an application, through their Union, for an increase of 1s. a day, or 6s. per normal week, piece-workers to receive a proportionate advance. They admit that they have already received an advance of several shillings, and that it was agreed that this should be final; but they explain that the continual increase in the cost of living and its present figure were not foreseen.

Gas-Fitters' Training Scheme.—In the course of their report to be presented at the meeting of the London County Council to-day, the Education Committee say: The Gas Light and Coke Company have decided that lads who are trained as gas-fitters under the Company's scheme shall, in future, be indentured; and they have submitted a draft of the proposed scheme and of the indenture. The Company's proposals appear to us to be satisfactory; and we have approved the draft scheme and indenture.

Capital Expenditure at Stockton-on-Tees.—The Local Government Board have sanctioned the borrowing by the Stockton-on-Tees Corporation of £400 and £1500 for gas-meters, £402 for gas-mains, and £1086 for water-mains; but they are not prepared to sanction loans in respect of expenditure since March 25, 1915, on gas-mains, motors, or electricity mains and services, except in so far as such expenditure may have been incurred on account of war requirements. The items in respect of which sanction has not been given falling under these heads include: Gas-meters £597, and gas-mains £224; but information is being obtained with regard to them, with a view to placing further details before the Board. The Board require further explanation as to the expenditure of £1197 on the conversion under the water-carriage system; this sum having been expended since March 25, 1915, the date of the Board's circular countermanding the capital expenditure.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Oct. 11.]

Nos. 13,946—14,299.

ALLEN, E.—"Incandescent burners, &c." No. 14,267.
BRADLEY, J. H.—"Light projectors." No. 14,296.
CHILLINGTON TOOL COMPANY.—"Gas and air injector." No. 14,192.
CHILLINGTON TOOL COMPANY.—"Gas-furnaces." No. 14,193.
DICKSON, A. S.—"Testing coal to ascertain the percentage of ash or moisture." No. 14,126.
DULCKEN, A. C.—"Converting natural gas, &c., into oils or solids." Nos. 14,097, 14,098.
FALK, STADELMANN, AND CO.—"Folding packing cases." No. 14,227.
FRANCHEL, L.—"Gas-lighters." No. 13,967.
HALLADAY, W. E.—"Joints, &c." No. 14,024.
LARSEN, C. F.—"Gas-lighter." No. 13,995.
MATTANI, A.—"Gas-heated laundry irons." No. 14,240.
NETTLETON, L.—See Chillington Tool Company. Nos. 14,192 and 14,193.
ROTH, J.—"Manufacturing coke." No. 14,210.
SWINDON, N.—"Vaporizing oils for enriching coal and other gases." No. 14,093.
TERRISSE, H.—"Treatment of cresols." No. 14,118.
VINCENT, J. L.—See Roth. No. 14,210.
WAKELING, W.—"Gas-stoves." No. 13,974.

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For failing to extinguish lights at the Ardsley Gas-Works when instructed by the police to do so, a stoker has been fined £2, with the alternative of 28 days' imprisonment.

The "Group System of Keith Lights," of which an illustrated account was given in the "JOURNAL" for Sept. 5 [p. 437], forms the subject of a pamphlet, of which a copy has been received from the James Keith and Blackman Company, Limited, of No. 27, Farringdon Avenue, E.C. It will be recalled that the advantages of the system dealt with were pointed out by Mr. Alex. Masterton, of Edinburgh, in his presidential address to the North British Association of Gas Managers.

A circular has been issued to the holders of common shares of the Baltimore Consolidated Gas, Electric Light, and Power Company, stating that the Company propose to make an issue of $8,500,000 of 5 per cent. five-year convertible gold notes. The right is given (subject to the approval of the Public Service Commission of Maryland) to the shareholders to subscribe, on or before Nov. 15, for the notes at par, to the extent of 60 per cent. of their respective holdings. The notes will be convertible at holders' option, after Nov. 15, 1918 (unless called for redemption), into common stock, at $110 per share.

The Highways Committee of Wandsworth are asking the Borough Council to forward a recommendation to the Home Secretary in favour of an order being made requiring all street-lamps throughout London to be extinguished at 10 p.m.; and that, as an experiment, during the ensuing month all street-lamps throughout Wandsworth be extinguished at this hour.

The Bradford Corporation have advanced the wages of employees in the gas and chemical works departments by 2s. a week to men paid by the week, 4d. per shift to those paid by the shift, and ½d. an hour to those paid by the hour. The General Purposes Committee of the Brighouse Corporation last week approved of a recommendation to increase the wages of the gas labourers to 31s. per week, *plus* 1s. war bonus. This means an advance of 3s. per week. On the recommendation of the Southport Corporation Gas Committee, the Town Council have agreed to the following wages increases: Stoking machinery men, from 5s. 6d. to 5s. 10d. per shift; stokers, from 5s. 6d. to 5s. 8d.; engine men, from 5s. 6d. to 5s. 10d.; boiler men, from 5s. 4d. to 5s. 6d.; and water-gas men, from 5s. 6d. to 5s. 8d. The wages of the retort-house foremen are in all cases to be raised from 43s. to 46s. per week.

STOCK MARKET REPORT.

THE week just closed has not been a very satisfactory one altogether to members of the Stock Exchange. With regard to activity, the aggregate of bargains done was fairly up to the mark in point of numbers, but there were so many "small deer" among them that business really bulked very moderate.

The keen competition of the new Exchequer Bonds—and the new French Loan, too, in a lesser degree—was acutely felt in gilt-edged quarters, and much soreness at the financial policy of the Treasury was felt and expressed. A crumb of comfort was picked up out of the Chancellor's declaration that he would issue the next War Loan—well, some time or other, and at the prospect of the exercise of conversion rights the present loan raised its head. But the markets in general found no comfort, and even the best of war news just now seems impotent to cheer. So, outside the War Loan, Government issues were lower; but Home Rail ordinaries were fairly firm. Americans and Canadians all took their tone from Wall Street, which was not cheerful.

In the Foreign Market, Japanese was in great favour, and the French Loan held steady; but the South American issues were dull. South Africans fully maintained their position. In connection with French credit, the announcement that United States financiers are lending £10,000,000 to the City of Paris is certainly significant.

There was nothing much of interest in the Miscellaneous Market. Rubber, however, was firm.

Business in the Gas Market was in a repressed state of activity. Very few undertakings were dealt in at all. The two big issues of Gas Light and South Metropolitan almost engrossed attention; none of the rest being able to furnish more than a couple of bargains apiece. The tone was not at all strong—feeling seemingly the weakening influence that affected the general markets.

The Money Market was very firm almost up to the close, when it eased. The strong feeling which was noted last week in regard to German operations inside the Stock Exchange is spreading and intensifying, and looks as if it would result in a crisis. A loud demand will be made upon the Government to drop its half-and-half measures and eradicate this poisonous growth at one stroke.

Bargains done for cash during the week were as follows: On Monday, European 13, Gas Light ordinary 77⅞, 78, 78½, 78⅛, 78⅜, 78¼, ditto maximum 60¾, Metropolitan of Melbourne 90, South Metropolitan 83¾, 84, 84¼, 84⅜, ditto debenture 59½. On Tuesday, Gas Light ordinary 77¼, 77⅛, 77⅜, 78, 78⅛, 78¼, ditto debenture 59⅜, 60, Imperial Continental 90½, South Metropolitan 83, 84. On Wednesday, Brentford "A" 86, Gas Light ordinary 77, ditto preference 73⅜, Imperial Continental 89½, South Metropolitan 84, 84¼. On Thursday, Bombay 5 5/16, 5¼, Gas Light ordinary 77, 77⅛, 77⅜, 77¾, ditto maximum 59½, ditto preference 70, Primitiva 42s. 6d., ditto preference 70s., 71s., South Metropolitan debenture 59, 60. On Friday, Gas Light ordinary 77½, ditto preference 70⅜, 70¾, South Metropolitan 83⅛, 84, 84¼, Tottenham "A" 119¼, 120, ditto "B" 90¼, 90½.

The Bank rate is 6 per cent.—as fixed on July 13.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When last Dividend.	Previous Div or Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
175,472	Stk.	Mar. 10	4	4	Aldershot 4 p.c. Pref.	..	65—70	..
1,551,868	,,	April 8	2½	5⅛	Alliance & Dublin Ord.	59—64	62—64	..
874,000	,,	July 10	4	4	Do. 4 p.c. Deb.	76—79	60—65	..
280,000	5	April 29	7½	8/-	Bombay, Ltd.	5¼—6⅜	5—5½	5 5/16—5½
50,000	10	Feb. 26	16	15/-	Bournemouth Gas and Water { 10 p.c.	29—30	25—27	..
388,110	10	,,	7	7/-	B ¶ p.c.	15—15½	11—11½	..
115,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	9½—10	..
159,740	—	—	—	4	4 p.c. Deb.	..	73—75	..
992,045	Stk.	Feb. 26	†14	55/-	Brentford A Consold.	261—266	86—88	86
734,920	,,	,,	†11	53/9	Do. B New	204—209	83—85	..
55,000	,,	,,	5	5	Do. 5 p.c. Pref.	109—111	85—90	..
221,400	,,	June 11	4	4	Do. 4 p.c. Deb.	91—98	..	..
217,380	Stk.	Feb. 26	11	10⅜	Brighton & Hove Orig.	208—213	165—168	..
244,200	,,	,,	8	7⅝	Do. A Ord. Stk.	154—159	121—124	..
580,000	20	Mar. 26	12½	22/6	British	44—45	34—35	..
120,000	Stk.	June 26	4	4	Do. 4 p.c. Deb. Stk.	88—90	71—73	..
245,771	Stk.	June 26	4	4	Buenos Ayres 4 p.c. Deb.	86—87	60—65	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1¼—2⅛	1½—1⅝	..
100,000	10	—	—	4/6	Do. 4½ p.c. Pref.	4—6	4½—5	..
100,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	Stk.	Feb. 26	5	5	Chester 5 p.c. Ord.	108—110	87½—88½	—86
1,518,280	Stk.	Feb. 12	5/9/4	49/4	Commercial 4 p.c. Stk.	106—108	73—74	..
[illegible]	,,	,,	5½	46/8	Do. 3½ p.c. do.	103—105	68—70	..
475,000	,,	June 11	8	8	Do. 3 p.c. Deb. Stk.	69½—71½	55—57	..
800 000	Stk.	,,	4	—	Continental Union, Ltd.	76—79	56—58	..
200 000	,,	,,	7	—	Do. ¶ p.c. Pref.	116—118	55—57	..
278,400	—	—	—	11½	Croydon B and C ¶ p.c.	..	175—185	..
—	—	—	—	—	Do. E	..	..	..
492,270	Stk.	—	6	5⅜	Derby Con. Stk.	123—125	100—105	..
55,000	,,	—	4	4	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	7/6	European, Ltd.	17½—18	12½—13½	18
16,318,430	Stk.	Feb. 10	4/17/4	43/-	Gas Light and Coke { 4 p.c. Ord.	99—102	77—78	77—78½
2,600,000	,,	,,	3½	3½	3½ p.c. max.	76—79	59—61	59½—60½
4,062,235	,,	,,	4	4	4 p.c. Con. Pref.	96—99	70—74	70—73½
4,674,850	,,	June 11	8	8	3 p.c. Con. Deb.	73½—74½	59—61	59½—60
130,000	,,	,,	10	10	10 p.c. Bonds	..	..	..
258,740	Stk.	Mar. 12	5	4½	Hastings & St. L. 3½ p.c.	87—89	78—83	..
70,000	10	April 29	11	6	Hongkong & China, Ltd.	16½—16¾	8—9	..
86,600	—	—	—	9½	Hornsey ¶ p.c.	..	125—135	..
131,000	Stk.	Mar. 12	7⅝	7⅜	Ilford A and C	151—154	112—117	..
65,780	,,	,,	6⅜	5⅞	Do. B	115—119	103—108	..
65,500	,,	June 26	4	4	Do. 4 p.c. Deb.	92—94	73—76	..
4,940,000	Stk.	May 14	9	4½	Imperial Continental	150—160	88 93	£91½—90½
1,235,000	Stk.	Feb. 12	3½	3½	Do. 3½ p.c. Deb. Red.	84—86	65—67	..
235,242	Stk.	Mar. 12	6½	6½	Lea Bridge Ord. 5 p.c.	119—121	87—92	..
2,498,905	Stk.	Feb. 26	10	5	Liverpool 5 p.c. Ord. { A / B	211—213 / 146—148	87—88	..
806,083	,,	June 26	4	4	Do. 4 p.c. Pr. Deb. Stk.	..	78½—79½	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4¼—4⅝	4—4¼	..
250,000	100	April 1	4½	4½	Met. of Melbourne 4½ p.c. Deb.	99—101	89—93	90
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	8¾—9½	..
1,575,892	Stk.	July 29	4½	4½	Newc'tle & G'tesh'd Con.	98½—99½	80—81	..
529,705	Stk.	June 26	3¾	3¾	Do. 3¾ p.c. Deb.	83—88	75—77	..
55,940	10	Feb. 26	7/14/0	7/8/2	North Middlesex ¶ p.c.	14—15	10½—11½	..
300,000	Stk.	May 14	8	8	Oriental, Ltd.	117—122	108—110	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	2—3	..
60,000	50	Feb. 26	18	60/-	Porisea, Island B	128—131	92—97	..
100,000	50	,,	12	55/-	Do. C	118—121	92—97	..
52,000	50	,,	10	—	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5¼—6	2 5/16—2 5/8	42/6
499,960	5	June 26	5	2/6	,, 5 p.c. Pref.	4⅜—5	3⅝—4	70/—71/-
521,600	100	June 2	4	4	,, 4 p.c. Deb.	91—98	80—82	..
—	—	—	—	4	,, ,, ,, 1911	..	..	..
346,198	Stk.	June 26	4	4	River Plate 4 p.c. Deb.	85—87	60—65	..
150,000	10	May 14	6	6/-	San Paulo { 5 p.c. Pref.	10½—11	8—8½	..
135,000	50	July 1	5	5	5 p.c. Deb.	47—49	43—45	..
135,000	Stk.	Mar. 12	10	10	Sheffield A	238—294	188—192	..
302,984	,,	,,	10	10	Do. B	229—294	188—192	..
593,500	,,	,,	10	10	Do. C	230—292	188—192	..
90,000	10	May 28	9	10/-	South African	10¼—11½	..	..
6,609,895	Stk.	Feb. 10	5/4/0	44/-	South Met., 4 p.c. Ord.	111—113	83—85	83—84½
1,895,445	,,	July 10	3	3	Do. 3 p.c. Deb.	73½—74½	59—61	59—60
224,290	Stk.	Feb. 26	8½	8	South Shields Con. Stk.	157—159	148—150	..
959,795	Stk.	Feb. 26	6	48/4	S'th Suburb'n Ord. 5 p.c.	114—116	80—82	..
60,000	,,	,,	5	5	Do. 5 p.c. Pref.	110—112	79—81	..
185,000	,,	—	—	48/4	Do. West Kent.	..	..	..
187,558	,,	June 26	5	5	Do. 5 p.c. Deb. Stk.	116—118	90—92	..
647,740	Stk.	May 14	5	5	Southampton Ord.	99—102	90—95	..
120,000	Stk.	Feb. 12	7½	7½	Tottenham { A 5 p.c.	185—188	130—123	119½—150
783,275	,,	,,	6	5⅞	B 3½ p.c.	116—117	90—92	90½—90⅝
181,255	,,	June 26	4	4	District { 4 p.c. Deb.	87—89	73—75	..
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5	Do. 5 p.c. Deb. Red.	93—95	60—65	..
296,476	Stk.	Mar. 12	5	5	Tynemouth, 5 p.c. max.	103½—109½	91—92	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	Stk.	Feb. 26	8⅛	78/9	Wandsworth A 5 p.c.	151—156	117—122	..
255,696	,,	,,	6⅞	63/9	,, B 3½ p.c.	129—134	101—103	..
108,075	,,	,,	5/17/8	55/1⅛	,, C 3½ p.c.	110—115	88—93	..
852,000	,,	,,	6¼	57/6	Wimbledon 5 p.c.	117—122	93—98	..
98,000	,,	,,	6⅝	63/9	Epsom 5 p.c.	121—126	98—103	..
88.416	,,	June 26	3	3	3 p.c. Deb. Stk.	66—69	53—56	..

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